



Central of Georgia 'Spot' Car Repairs Page 31

RAILWAY

LOCOMOTIVES AND CARS

A SIMMONS BOARDMAN TIME-SAVER PUBLICATION

SEPTEMBER 1958

Combustion Characteristics of 'Economy' Fuels . . . Page 38



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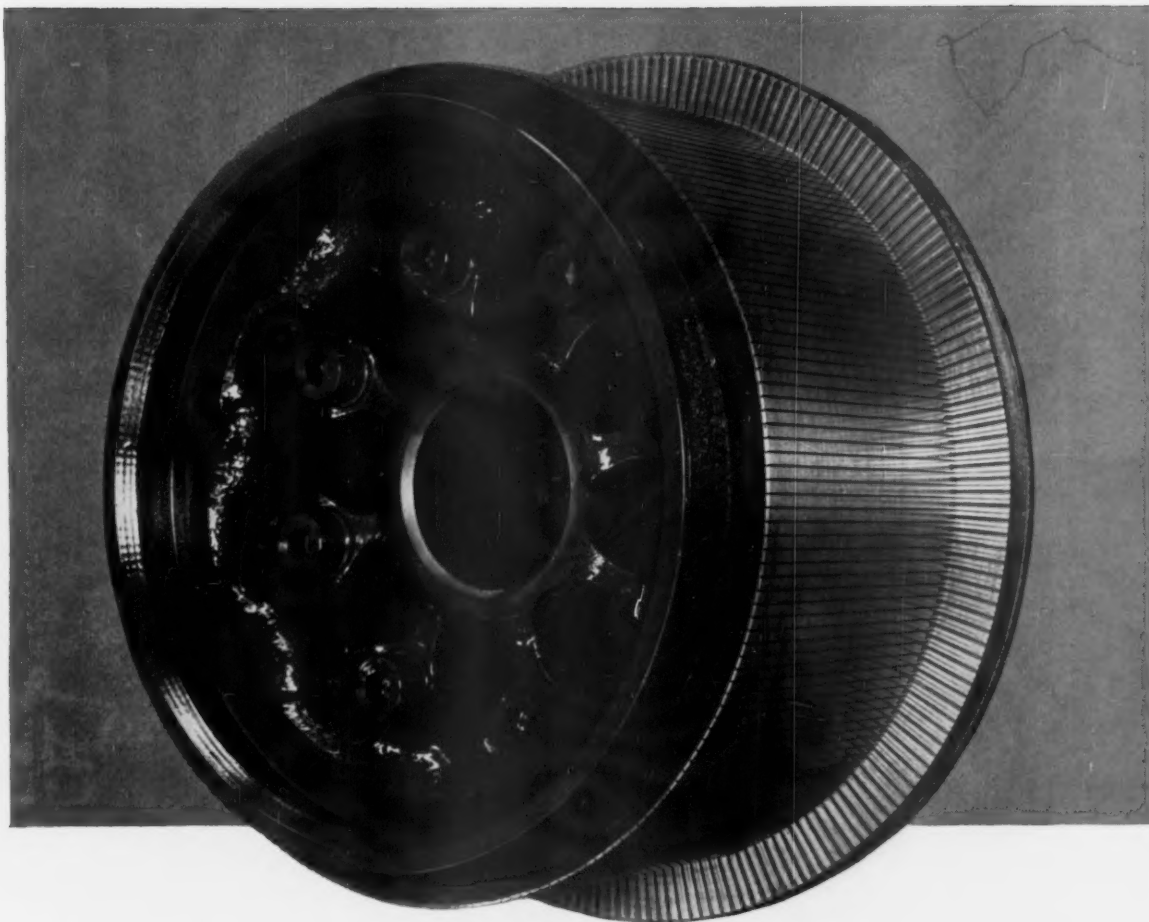
For more information about Texaco 1693 Dieseltex HD-40, and Texaco's Systematic Engineering Service, call the nearest Railway Sales Division office—there's one in

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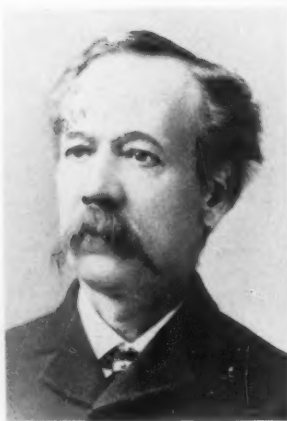
COLUMBUS 16, OHIO, U. S. A.



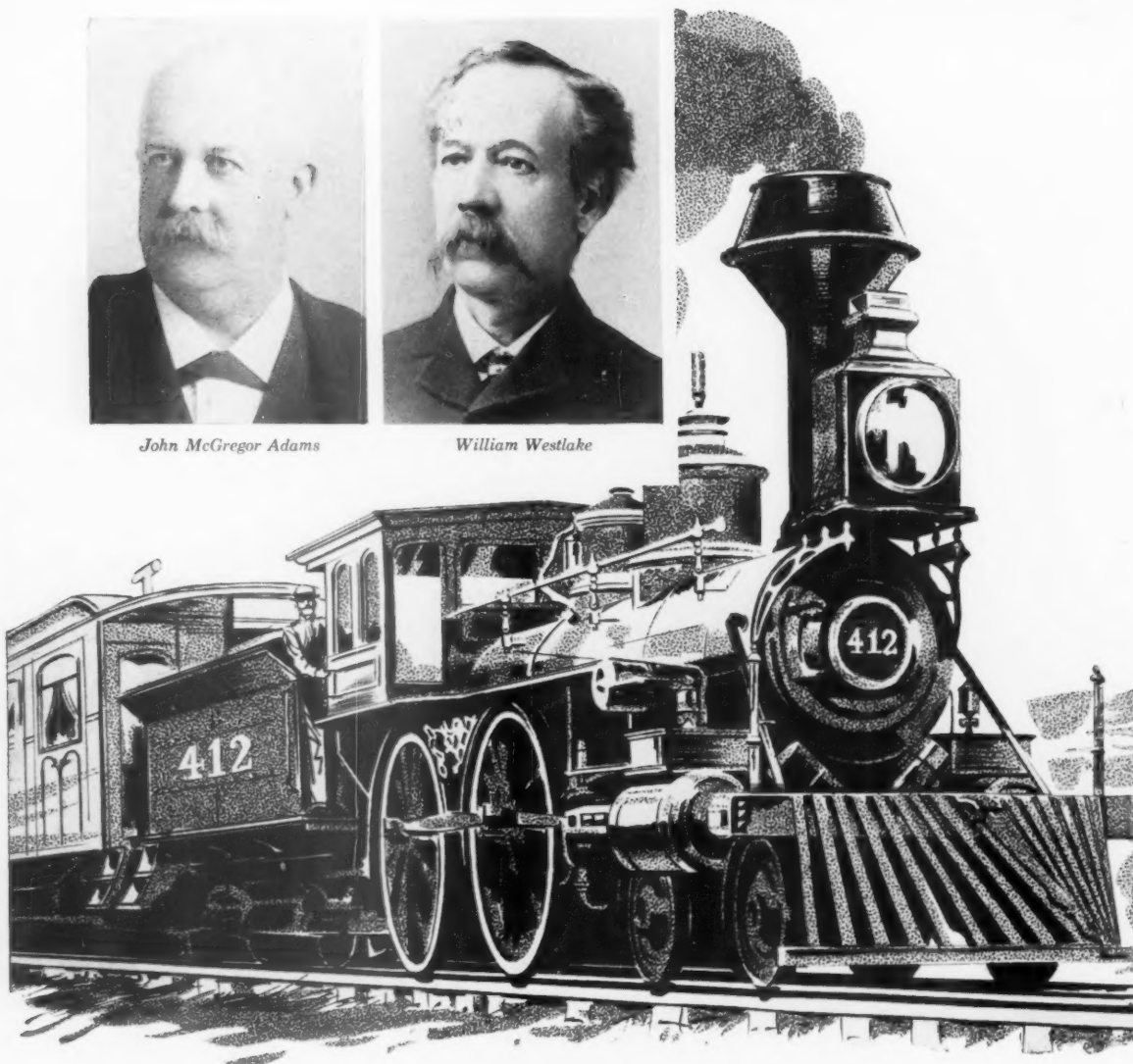
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John McGregor Adams



William Westlake



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LOCO- MOTIVES AND CARS

The Oldest Trade Paper
in the United States

SEPTEMBER 1958—VOL. 132 NO. 9

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REPORT FOR SEPTEMBER

Second National Railroad Apprenticeship Conference

Management and labor delegates from 38 railroads at the second National Railroad Apprenticeship Conference in St. Louis, Mo., July 16-18, heard A. K. Atkinson, president of the Wabash, who was the keynote speaker. He reviewed the current railroad situation and, in speaking for the management of American railroads, welcomed the conference programs of the type planned. He said "It will offer another opportunity for management and labor to work together for their mutual good. There are so many different crafts and such a variety of jobs necessary in modern railroad operations that training on the job must be a continuous process. Any plan by which new employees can learn the right way to do the job expected of them is important to the railroad industry."

Clair M. Roddewig, president of the Association of Western Railways, had high praise for the industry's skilled workers. He told the conference that "we'll need more than ever the skills you have, and the new skills you must teach to the next generation of railroad men as technology transforms us. In spite of recent sharp cuts in shop craft employment, the need for effective apprenticeship programs will be greater than ever before when the railroads are granted equality of treatment with their competitors."

Michael Fox, president of the Railway Employees Department, AFL-CIO, presented awards to a group of boys singled out as outstanding apprentices in the railroad shop crafts. Other speakers included Martin Grotjohan, supervisor of apprentice training and education, Locomotive and Car Equipment

Department, General Electric Company, and R. W. Trimble of the U. S. Naval Training Center at Great Lakes, Ill.

The final session of the conference was devoted to an outline of Railroad Retirement Board operations as related to apprentices John Griner, administrative assistant to the labor member, RRB, and Thomas M. Healy, management member, RRB, handled the presentation. Eugene M. Hart, personnel manager of the Central of New Jersey, and George O'Brien, assistant president of the Brotherhood Railway Carmen, become chairman and co-chairman, respectively, for next year's convention, succeeding Harold M. Hoffmeister, general purchasing agent of the Missouri Pacific, and P. L. Shackelford, international representative of the Sheet Metal Workers International Association. The 1959 conference will be held at Omaha, Neb.

Special Committee Interprets Ex Parte 174

For several weeks a Special Committee of the AAR Mechanical Division has been engaged in reviewing questions pertaining to the intent of certain rules contained in the new and revised Locomotive Inspection Rules, as covered by Ex Parte No. 174, which are to become effective January 1. The report of the committee has now been submitted to the General Committee of the Mechanical Division and will be transmitted to Division 3 of the Interstate Commerce Commission.

The members of the Special Committee on Interpretations of Locomotive Inspection Rules are W. O. Teufel, assistant chief mechanical officer, Pennsylvania; W. C. Ward-

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TIME SAVING IDEAS FOR SEPTEMBER

MOTIVE POWER AND CAR

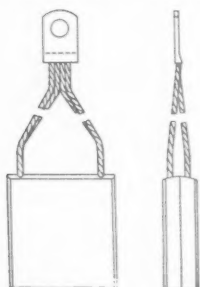
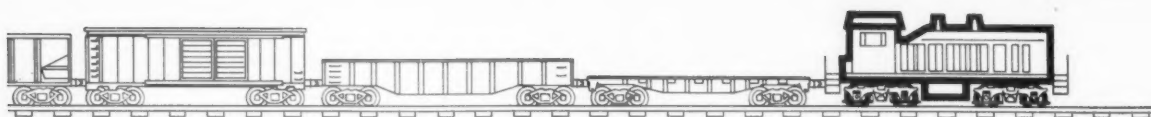
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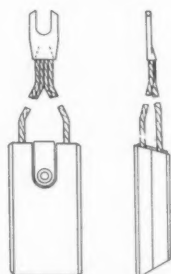
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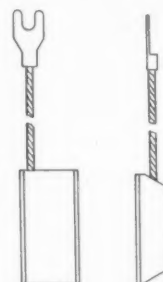
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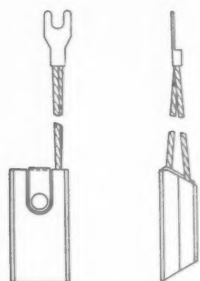
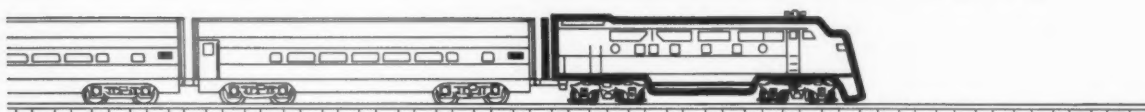
Speer Brush No. 3488-E46
For EMD, MOT—D7, D17, D27,
D37, 716E2, 721 721A2



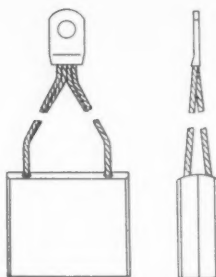
Speer Brush No. 3684-E44
For EMD, GEN.—D12, D15



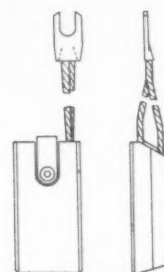
Speer Brush No. 4216-E35
For EMD, AUX GEN —A3001
A7159
BLOWERS—A7158, A7160, A8101



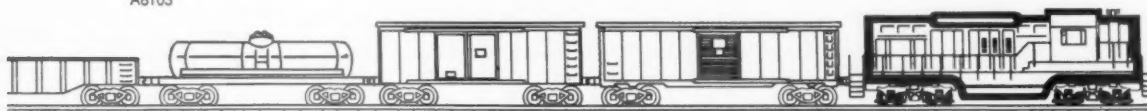
Speer Brush No. 4692-E35
For EMD, AUX GEN —A3001,
A7159, A8102
BLOWERS—A7158, A7160, A8101,
A8103



Speer Brush No. 3602-E34
For GE, MOT—726 730, 752



Speer Brush No. 3717-E44
For GE, GEN —GT564B1, C1;
GT566C1, D1; GT567; GT569;
GT576; GT581A1; GT586; GT571



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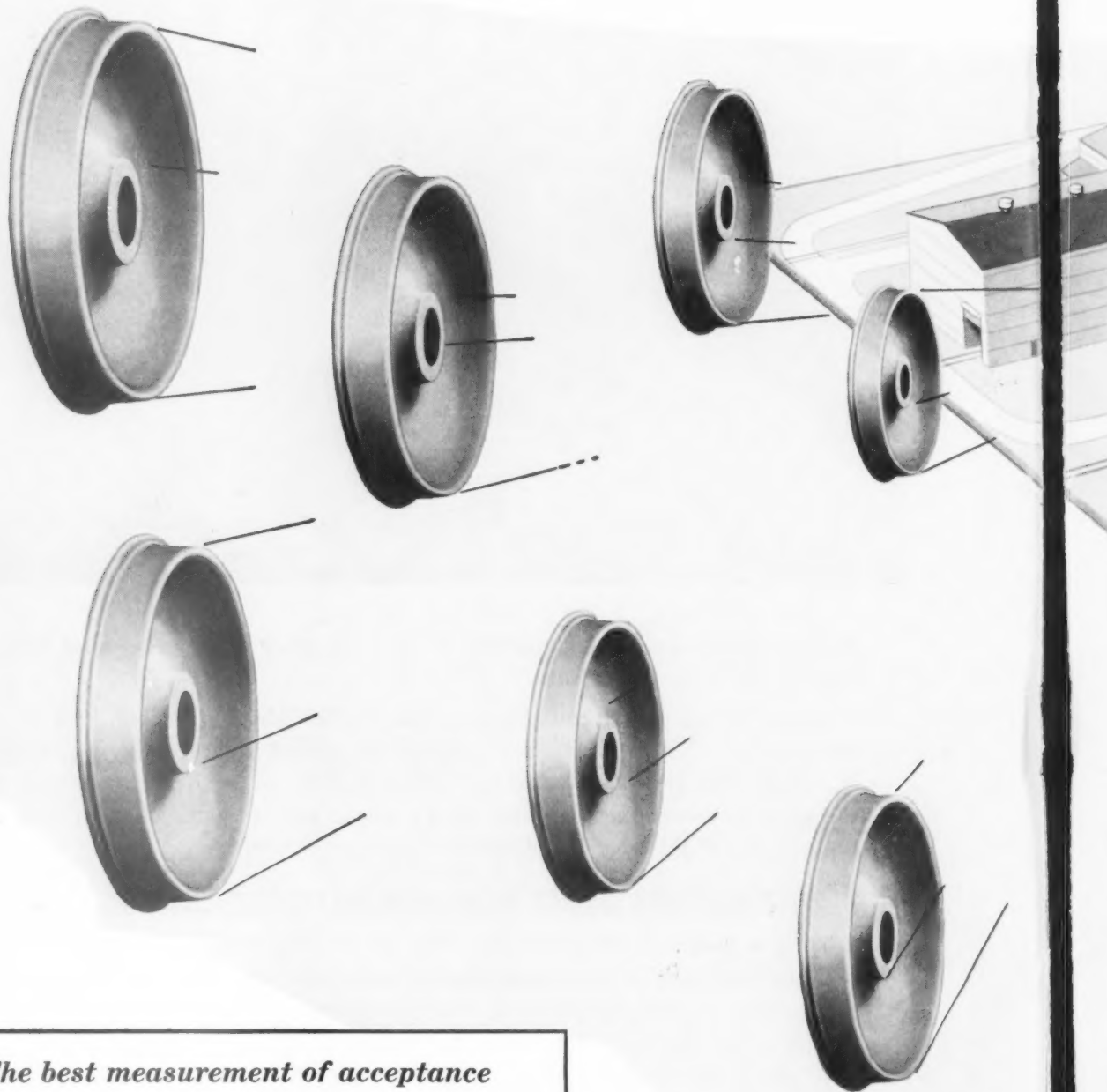
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Complete line of cleaners for all railway needs

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The best measurement of acceptance

1953

One thousand Griffin EQS Steel Test Wheels put into service.

1958

Griffin EQS Steel Wheels an AAR standard . . . with over 500,000 in service!



Modern Plants strategically located for service

new Kansas City Plant...



More Griffin Steel Wheels rolling out to join the first half-million!

Here's the newest chapter in the story of fifty million freight car wheels produced by Griffin since 1877.

A brand new ultra-modern plant—just put into production in Kansas City—is helping to add more Griffin EQS Steel Wheels per day to the over 500,000 now in use. All railroads and private car lines from coast to coast can now ex-

pect better service through strategic plant location.

Service of the first half-million has demonstrated the cost-cutting qualities of Griffin Steel Wheels: longer service life... better wear... greater uniformity... closer tolerances... a complete wheel inventory with fewer tape sizes and full interchangeability.

Give the "green" to

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ELECTRIC QUALITY STEEL

and watch your costs go down!



GRIFFIN WHEEL COMPANY, 445 N. Sacramento Blvd., Chicago 12, Illinois

In Canada: Griffin Steel Foundries, Ltd., St. Hyacinthe, Quebec

REPORT FOR SEPTEMBER—Continued from page 5

well, general mechanical superintendent—locomotive, New York Central; V. F. Leitz, regional maintenance supervisor, Baltimore & Ohio; M. B. Crowley, superintendent motive power, Great Northern; L. C. Shults, superintendent motive power, Southern; G. W. Meredith, assistant general master mechanic, Norfolk & Western; J. L. Hufham, general mechanical instructor, Atlantic Coast Line, and R. F. Dougherty, general electrical and air-conditioning inspector, Union Pacific.

Chicago Transit Board Announces Rapid Transit Research Program

Organization of a \$250,000 co-operative research and development program to step-up progress of the high-speed era in urban transportation was announced recently by the Chicago Transit Board. Objectives of the program are the development and testing of lightweight rapid transit trucks, gear drives, axles and auxiliary braking specially designed for high-performance operation of lightweight, all metal rapid transit cars in the rights-of-way of multi-lane, grade-separated expressways. Speeds upward to 75 mph, a longer period of acceleration at the rate of 3½-mph per sec and enhanced passenger comfort and safety are the results expected.

CTA's associates in this venture are the Transit Research Corporation; Westinghouse Electric Corporation; General Electric Company; Budd Company; General Steel Castings Corporation; St. Louis Car Company; Dana Corporation; Westinghouse Air Brake Company; American Steel Foundries; Timken Roller Bearing Company and SKF Industries. Five of the 100 rapid transit cars now being built for the CTA by the St. Louis Car Company are to be equipped with the products of this program. These five cars, each a single unit, double end car,

(Continued on page 18)

Orders and Inquiries for New Equipment

Placed Since the Closing of the August Issue

Diesel-Electric Locomotive Orders

Road and builder	No. of units	Horse-power	Service	Other detail
CANADIAN NATIONAL: Montreal Loco. Wks.	32	1,800	Passenger	Deliveries of these 144 units to begin in October and completed by August 1959.
	4	1,400	Road switch.	General Motors Diesel will also build 30 steam generator units.
	23	1,000	Yard switch.	
General Motors Diesel	16	1,200	Road switch.	
	69	1,750	Road switch.	
NORFOLK & WESTERN: Electro-Motive	192	1,750	—	GP-9's, 16 for passenger service. Beginning October 12 units a month to be delivered.
				T-6's.
				RS-11's. Beginning October, 4 units a month to be delivered.
Alco	40	1,000	Switch.	
	36	1,800	Road switch.	

Freight-Car Orders

Road and builder	No. of cars	Type of car	Cap. tons	Other detail
ATCHISON, TOPEKA & SANTA FE: Company shops	25	Flat	—	88-ft for piggy-back service. To be 9 ft 6 in. wide. To have been completed last month.
CANADIAN NATIONAL: Eastern Car Div., Dominion Steel & Coal	435	Hopper	70	Delivery expected to begin late this year.
National Steel Car	60	Air dump	—	—
CHICAGO, BURLINGTON & QUINCY: Company shops	100	Box	50	To be built next year. Cost, approximately \$1.26 million.
NORTH AMERICAN: Pullman-Standard	20	Hopper	—	2,003 cu ft cap. Cost, approx. \$9,300 each.
	15	Hopper	—	2,893 cu ft cap. Cost, approx. \$11,000 each.
UNION TANK CAR: Company shops	30	Tank	—	Class 111A. To be delivered last quarter 1958 and first quarter 1959.

Passenger-Car Orders

Road and builder	No. of cars	Type of car	Other detail
UNION PACIFIC: St. Louis Car	15	44-seat coaches	30 cars for delivery middle 1959.
	10	Lunch-counter, cafe lounge	
	5	Postal storage mail	

Inquiries and Notes

Trailer Train Company in market for 400 85-ft flat cars for piggyback service. To have grid type underframes, rather than usual center sill; roller bearings; rubber-cushioned draft gears, and built-in semi-automatic devices for securing trailers to car. 85-ft car expected to be 10 per cent lighter than company's 75-ft car.

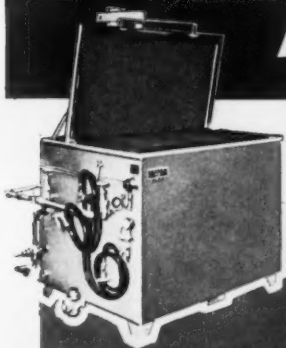


Last major US main line steam passenger operation came to an end recently when Norfolk & Western leased ten road passenger diesels from Atlantic Coast Line and Richmond, Fredericksburg & Potomac to handle all its through trains. First diesel-powered, westbound Powhattan Arros is arriving at Roanoke, Va., while one of the last steam-hauled N&W passenger trains is about ready for its eastbound departure on the next track. Leased passenger locomotives will be replaced by road switchers coming later this year from Electro Motive Division.

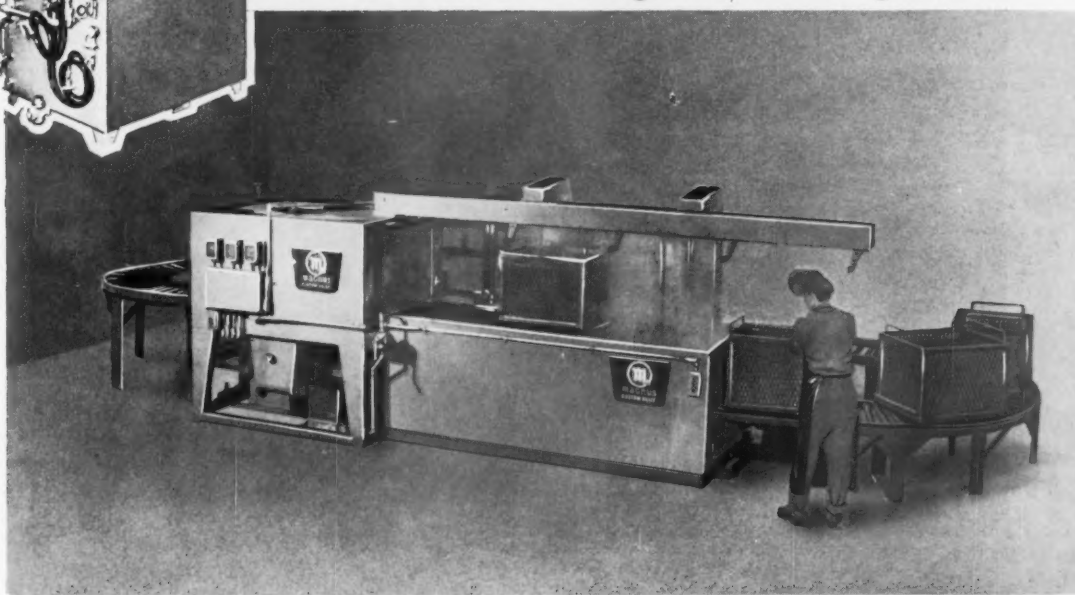


First of 1,000 new Milwaukee 50-ton box cars are now in service. On each side the cars have a plug and a conventional sliding door producing a 15-ft total opening. The cars have a NSF steel floor, steel lining for 3 ft above the floor, and ¾-in. plywood above the steel lining. The cars are 50 ft. 5 in. inside, have an inside width of 9 ft 4 in., are 10 ft 6 in. high inside, and have a capacity of 3,966 cu ft. Pullman-Standard and General American Transportation are each building 500 cars. Milwaukee ordered 100 covered hoppers at same time.

AUTOMATIC FILTER CLEANING



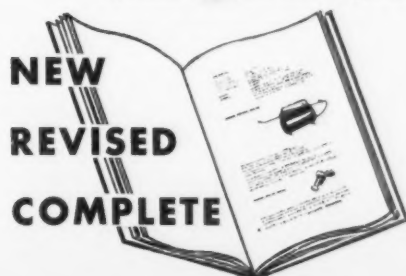
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TO completely automatic custom installations capable of washing, rinsing, oiling and drying up to 96 filters per hour.

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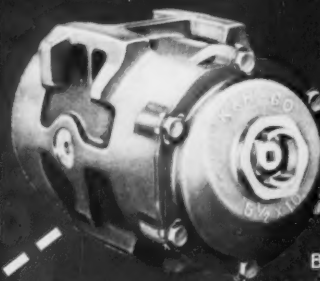
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KAR-GO Bearings



AAR APPROVED!



38 U.S. and Canadian railroads and more than 65,000,000 in-service bearing miles prove Allison KAR-GO Bearings solve the hot-box problem.

Keeps lubricant sealed in — dirt sealed out.

Averages one inspection every 20,000 car miles.

Repays its cost in two years by cutting maintenance and operating expense.

Goes 75,000 bearing miles on 1 pint of oil.

Offers railroads a low-cost solution to the hot-box problem.

end hot boxes at rock-bottom price

YOUR RAILROAD is running longer trains on faster schedules—heavier duty on the equipment. Why take a chance that a hot box will disrupt schedules, disappoint customers and increase costs?

Lowest-cost Allison KAR-GO Cartridge Bearings whip the hot-box problem at a kind-to-budgets price.

Millions of in-service railway miles and three years of rugged field testing prove the worth of KAR-GO Cartridge Bearings. This full-round sleeve bearing provides rugged low-cost features together with the advantages of sealed-in, low maintenance units in a way

that no “gadgetized” journal brass can approach.

An Allison KAR-GO Bearing will actually pay for itself in two years by reducing routine maintenance and service failure cost. Subsequently additional KAR-GO Bearings can be added to your new car fleet from savings in hot-box elimination alone.

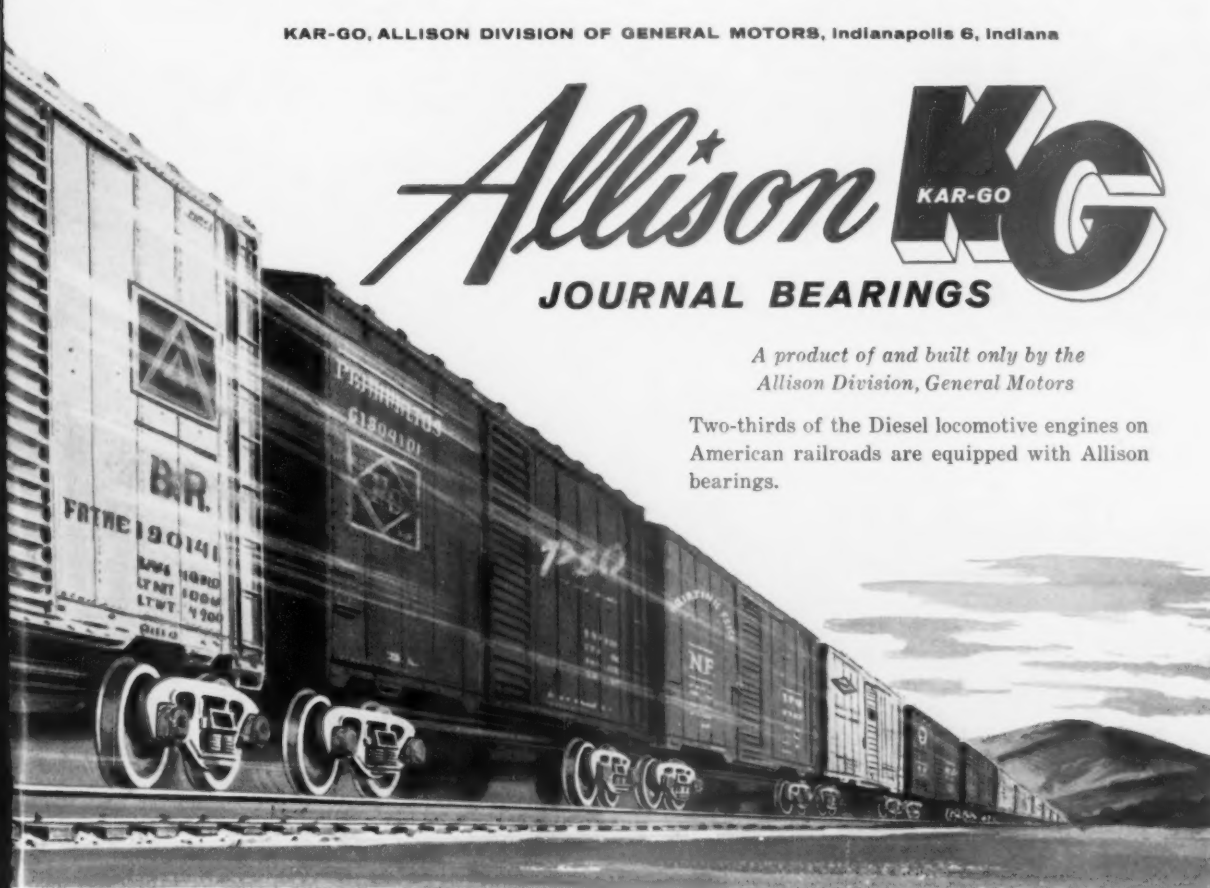
To be sure to keep your equipment operating on schedule with a bearing that ends hot boxes and cuts terminal inspection and oiling time—a bearing you can really rely on—install Allison KAR-GO Cartridge Bearings on your next conversion or new freight car build.



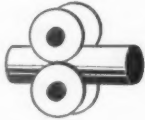


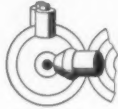

KAR-GO, ALLISON DIVISION OF GENERAL MOTORS, Indianapolis 6, Indiana

Allison **KAR-GO**
JOURNAL BEARINGS

*A product of and built only by the
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Two-thirds of the Diesel locomotive engines on American railroads are equipped with Allison bearings.



The Bethlehem wheel  you buy today is a *proven* wheel—a type that years ago graduated from the development stage. It's made of steel that is first cast into  ingots, then “worked” in a series of steps that add strength and long life. The first of these steps takes place when the ingots are rolled  into blooms. After the blooms have been sliced, the rounds are forged,   then processed in a vertical rolling mill. Wheels produced by this method are *wrought-steel*  wheels, and Bethlehem has sold millions of them during the past 30 years. Conforming strictly to AAR standards, they are your best buy  for freight, passenger, and diesel-locomotive service. You can install them with confidence.

BETHLEHEM WROUGHT-STEEL WHEELS

COMPANIONS TO BETHLEHEM FORGED-STEEL AXLES

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New SPERRY REFLECTOSCOPE cuts time and cost on axle testing

Designed specifically for railroad use, the Type US Sperry Reflectoscope offers a faster, simpler, more accurate and more economical means of testing. Axles can be tested "in place" on locomotives or cars, resulting in major maintenance economies by detecting hidden flaws before they cause costly failures or breakdowns.

The Sperry Reflectoscope offers these advantages:

Complete portability... weighs only 35 pounds

Low power consumption... built-in voltage regulation

*Simplified four-knob control panel
New, completely transistorized
plug-in alarm system... eliminates
possibility of human error*

Bright... easy to read video presentation

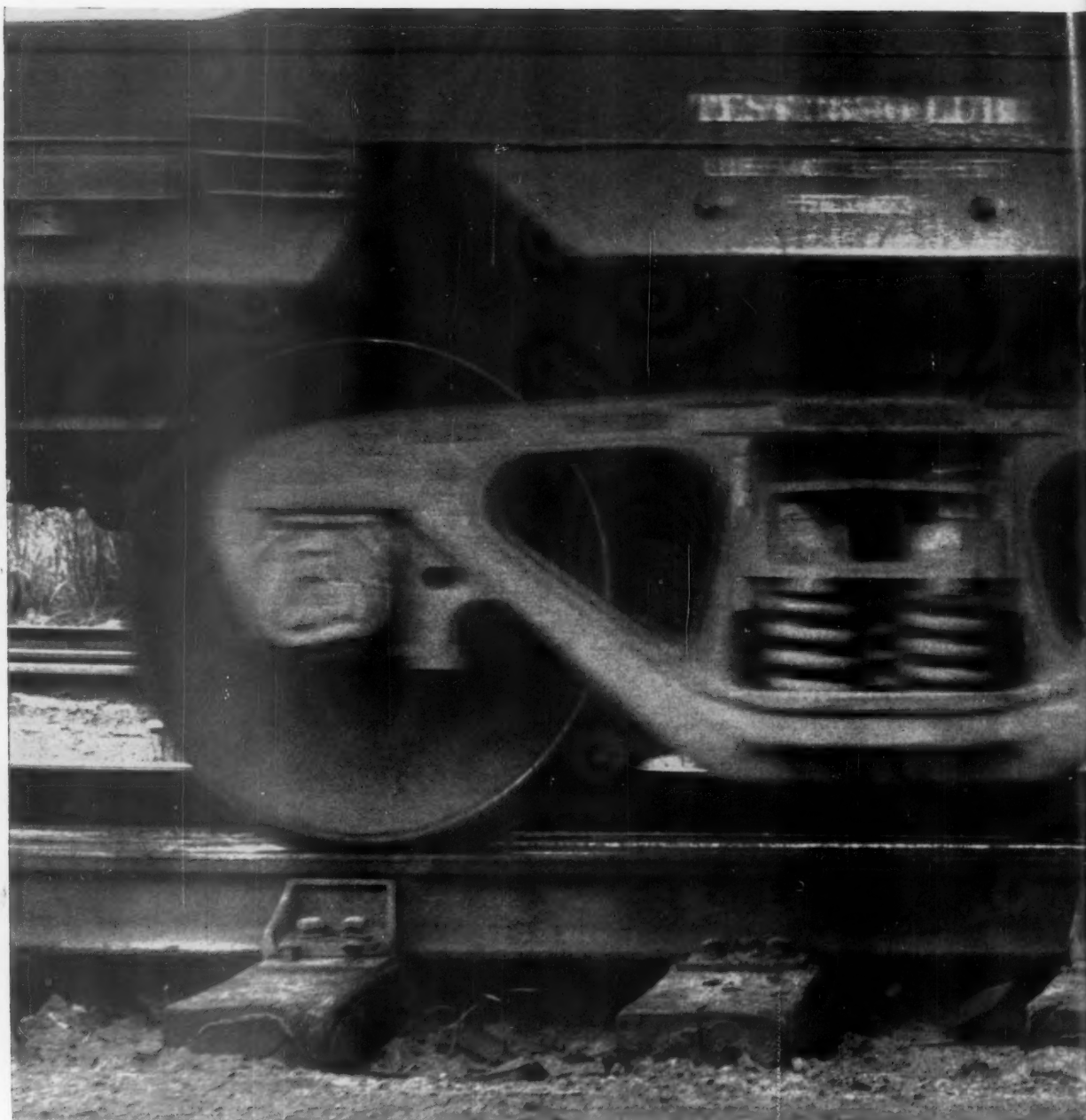
Sperry Reflectoscope Type US is another fine example of Sperry Rail Service's "engineering exclusively for railroads." If you're interested in cutting maintenance costs and achieving maximum equipment utilization, send for details of this outstanding inspection tool.



SPERRY RAIL SERVICE

SUPPLYING RAILROADS EXCLUSIVELY

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Where payloads roll on roller bearings... Gulf makes things run better!

NEW GULFCROWN R.R.

New Gulfcrown R.R. is a lithium base grease especially developed to provide better lubrication for railroad car roller bearing journals. It has been tested and approved against A.A.R. Specification No. M-917-56.

Stands up at high temperatures. New Gulfcrown R.R. has been used successfully in bearings operating at temperatures as high as 250° F.

Pumps freely at low temperatures. Gulfcrown R.R.

Grease doesn't become hard, or unworkable, even when subjected to temperatures as low as 0° F.

Won't thin out at high speeds. Its excellent mechanical stability keeps Gulfcrown R.R. from thinning out under the churning action of high speed bearings.

Resists washing action of water. Won't wash away even under wettest conditions. Gulfcrown R. R. also provides protection against rust.



GREASE

Excellent oxidation stability. New Gulfcrown R. R. Grease is effectively inhibited against oxidation to insure long life, both in storage and in use.

Gulfcrown R.R. Grease is available now, in 35 lb. pails, 100 lb. drums and 400 lb. drums. Let us prove that you will get more effective roller bearing protection—and reduced maintenance costs—with this outstanding new grease. Write or phone.

GULF OIL CORPORATION

Dept. DM, Gulf Building
Pittsburgh 30, Pa.



REPORT FOR SEPTEMBER—Continued from page 10

will be test-operated as a train in the West Side subway service, beginning next spring or summer.

The St. Louis Car Company, using TRC designs, will build three car-sets of trucks. One set will be equipped with GE 100 hp motors, axles and gears, a conventional propeller shaft, TRC's conventional center bearing support for the car body and a combination of coil steel and rubber springs. GE control equipment will be installed. The second set of trucks will have Westinghouse 100 hp motors, and the Dana Corporation close-coupled gear drive unit which eliminates the propeller shaft. The body will be supported by center plates with side bearings, and springs will be a combination of coiled steel and rubber. The third set of trucks will have Westinghouse 100 hp motors, a Dana Corporation drive unit having a torque tube instead of a propeller shaft, center bearing car body support, and flat leaf springs. Westinghouse controls will be used with the motors for these two car-sets of trucks.

GSC will build one car-set of trucks to its own specifications. This set will be equipped with GE 100 hp motors and gear units, conventional propeller shaft, center bearing support for the car body and a combination of coiled steel and rubber springs. Control equipment will be supplied by GE. The Budd Company will build one car-set of trucks to its own specifications and equip them with Westinghouse 100 hp motors and the close-coupled gear drive unit. The body will be supported on a combination of center and side bearings and will rest on air springs. Control equipment will be supplied by Westinghouse. Gear and axle unit bearings will be Timken and SKF for all five car-sets of trucks.

The 100 hp motors and controls to be

used were recently developed through a co-operative arrangement CTA had with Westinghouse and General Electric.

C&O-N&W-PRR Standard Hoppers Under Construction

Three sample, standardized 70-ton hopper cars, which promise savings in construction costs and maintenance, are being built in the shops of the Chesapeake & Ohio, Norfolk & Western and Pennsylvania. These roads own approximately 165,000—31 per cent—of the hopper cars in the US.

The new design represents the combined efforts and studies of the three railroads and has been presented to the entire industry and to car builders as an approach to a finalized design for a standard hopper car acceptable

to all railroads. Much interest has been shown by other lines owning 65 per cent of the US hopper cars, including the B&O, B&LE, CB&Q, IC, L&N, NYC, NYC&StL, Reading, and WM.

The new standard car will look much like many hoppers now in service. Standard dimensions will apply to all component body parts—sheets and plates in the sides, ends and slopes; structural shapes in the underframe; and side posts and center sills.

Steel mills will no longer find it necessary to change mill schedules to fill orders for individual railroads. High-tensile or copper-bearing steel may be used in the construction. Each road can apply its own "specialties," but even these will be designed to be mechanically interchangeable.

The three cars will be completed shortly and will then undergo a series of laboratory and service tests to prove their design.

Personal Mention

Atlantic Coast Line.—Waycross, Ga.: W. B. CREASY, JR., appointed foreman, locomotive department; L. A. McLEAN, foreman, car department, repair tracks, second shift, and H. W. BLOUNT, foreman, car department, train yard. Savannah, Ga.: W. L. WINSTED appointed foreman. Formerly foreman at Emerson shops.

Canadian National.—Montreal: EDWARD T. HURLEY appointed chief of technical research. A. T. G. WESTBROOK, assistant controller of tests, appointed controller of tests and materials research, succeeding Mr. Hurley.

Chicago & North Western.—St. Paul, Minn.: J. E. BREHM appointed master mechanic. Huron, S.D.: C. D. HILL appointed master mechanic. Clinton, Iowa: H. K. COX appointed master mechanic.

Chicago, Rock Island & Pacific.—Chicago: JOHN H. LLOYD appointed general superintendent of motive power to succeed M. R. WILSON, retired. Mr. Lloyd formerly general manager of the Alaska.

Illinois Central.—Chicago: JOHN L. CARVER, mechanical and research engineer, retired.

Long Island.—Morris Park Shops, N.Y.: R. P. TURNBULL appointed superintendent of shops. J. BRANNAN appointed master mechanic.

Missouri Pacific.—Houston, Tex.: E. G. WALL, road master mechanic, Kingsville and Dequincy divisions, and L. W. MARTIN, terminal master mechanic, Settegast Terminal, have exchanged positions.

New York Central.—New York: S. T. KUHN appointed chief mechanical officer. Former position of chief mechanical superintendent abolished. Collinwood, Ohio. R. F. BATCHMAN, mechanical superintendent of the P&LE, appointed assistant superintendent diesel shop of the NYC at Collinwood. Former P&LE position abolished.



S. T. Kuhn



W. F. Kascal

Mr. Kuhn entered service of NYC in 1919 as a machinist at Collinwood shops, Cleveland. Subsequently general foreman, engine-house; assistant master mechanic; master mechanic; assistant superintendent of equipment at Chicago; assistant to general superintendent of equipment; chief, management services, NYC System, New York; assistant chief mechanical officer, and chief mechanical superintendent.

Pittsburgh & Lake Erie.—Pittsburgh: W. F. KASCAL appointed chief mechanical officer. Formerly assistant vice-president of equipment, NYC system, which position has been abolished.

Mr. Kascal began railroad career in 1922 on Chicago, Burlington & Quincy at Chicago as a machinist. Subsequently was master mechanic and superintendent of motive power on Colorado & Southern and mechanical superintendent on Texas & Pacific at Dallas, Tex. In September 1954 was appointed chief mechanical officer, NYC System at New York, and in 1956 became assistant vice-president-equipment.

Norfolk Southern.—Norfolk, Va.: M. B. DOWDY appointed chief mechanical officer at Carolina shops. Former position of superintendent motive power and equipment abolished.

(Continued on page 82)

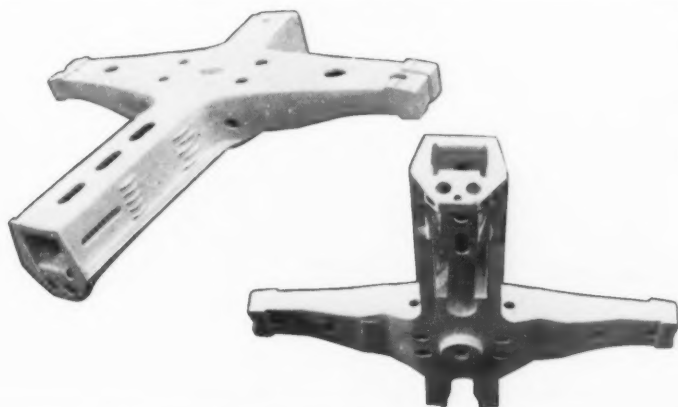
Summary of Monthly Hot Box Reports

Month	Cars set off between terminals with hot boxes		Miles per car set off
	System	Foreign	
May 1953	5.892	11.433	173,945
May 1954	4.416	6.510	248,353
May 1955	4.852	8.672	216,788
1956			
May	4.672	10.903	196,688
June	6.777	15.125	135,774
July	8.484	16.067	113,573
August	9.891	16.892	113,474
September	6.834	12.629	149,970
October	4.357	8.429	243,505
November	2.650	5.560	359,759
December	2.256	4.436	438,425
1957			
January	3.373	6.121	291,453
February	3.272	6.844	264,538
March	3.164	6.687	307,306
April	3.949	8.447	228,493
May	6.580	12.691	154,387
June	8.285	16.277	115,749
July	10.438	18.819	96,064
August	9.662	17.639	109,839
September	6.736	12.066	157,694
October	4.616	8.050	233,004
November	2.839	4.762	370,693
December	2.833	3.486	462,475
1958			
January	2.037	3.190	495,080
February	2.302	3.901	377,613
March	2.846	4.688	354,454
April	3.633	5.662	264,093
May	6.065	8.718	178,975



Where railroad progress is cast in steel....

Today—more and more
railroads order Commonwealth cast steel
underframe ends for new or
existing freight equipment



*The combining of many separate parts into a one-piece casting
eliminates failures and repair problems in critical areas.*

One-piece cast steel underframe ends decrease maintenance costs and "in shop" time on box cars, refrigerator cars and other types of freight equipment by eliminating the causes of most underframe failures. Integral body bolsters, draft gear stops, strikers, coupler carriers, center fillers, center plates and side bearing pads provide many advantages for new or rebuilt cars.

- eliminate body bolster failures
- increase car life
- simplify car building and repairing
- provide greater strength in critical areas
- resist rust and corrosion
- meet AAR code for interchange

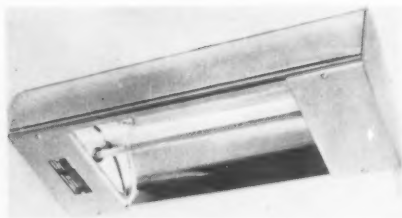
Here is a proved way to get longer freight car life with reduced upkeep costs—now in service on many progressive railroads.

GENERAL STEEL CASTINGS

GRANITE CITY, ILL. • EDDYSTONE, PA. • AVONMORE, PA.



LOCOMOTIVES AND CARS WHAT'S NEW IN EQUIPMENT



Infra-Red Unit

The aluminum housing and reflector of the R-600 Infra-red Oven section has been designed to use a special quartz-enclosed nichrome heating element. This gasless heating tube emits radiation at a wavelength of 2.3 microns, said to be the length of wave most completely absorbed by water, solvents and many industrial materials, and therefore, most effective for heating, drying and baking. Unlike most other types of electric radiant heaters, this element produces very little visible radiation, eliminating glare and loss of energy.

Both the quartz tube element and its housing can be furnished in any required length, to operate at any voltage and in a wide range of wattage ratings. The heating element is readily responsive to input controllers, making it particularly adaptable to cycling operations and automation. *Lighting Div., Safety Industries, Inc., Dept. RLC, P. O. Box 70, Milford, Conn.*

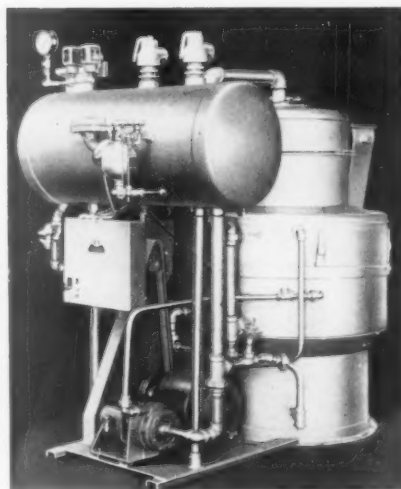


Arc Welding Machines

This Airco motor generator machine is designed for application of the gas-shielded metal-arc processes where equal burn-off rate and wire-feed must be maintained. Its rising volt-ampere curve reacts instantaneously to all wire-feed speed changes to maintain constant arc length. The current rating is 450 amp continuous; weight, 840 lb; height, 28 3/4 in.; width, 20 5/8 in., and length, 34 5/8 in.

Hornet motor generators, now available in 300 and 400-amp models, are designed for d-c metal-arc and inert-gas-shielded arc welding. Quick response and a well-controlled arc

enable vertical and overhead work without excessive spatter or special adjustments. Controlled current peaks result in faster welding speeds and stronger welds. Wide current range, complete phase insulation and sturdy construction are features. Hornet 36B's are built for stacking one on top of another. *Air Reduction Sales Company, Dept. RLC, 150 East 42nd st., New York 17.*



Steam Generators

A complete series of water tube boilers, known as the Vapor Drum Modulative line, have heating surfaces designed for maximum output in minimum space. The weight is such that only 100 to 175 lb per sq ft of support is required. The units are completely automatic, explosion-proof, and require no chimney—merely an outlet for gases.

The line ranges in sizes from 20 hp to 150 hp. Low pressure steam can be delivered at 0 to 15 psi, or high pressure steam at 5 to 150 psi. The smaller units will burn No. 2 fuel oil or low pressure gas. The 100-hp and larger models can burn No. 5 fuel oil as well. *Vapor Heating Corp., Dept. RLC, 6420 W. Howard st., Chicago 31.*

Water Treating Resin

Nalcite HCR-W is a cation exchange resin said to have greater physical stability than ever before attained in a cation exchanger. Bead breakage, which creates fines that cause pressure drop build-up, is virtually eliminated; so is the resin loss usually caused by broken beads.

Operating temperatures as high as 250 deg F do not affect stability or capacity. Nalcite HCR-W is particularly suitable for use in hot-line zeolite water treating plants. In addition, it can be used in mixed bed demineralizers. *National Aluminate Corp., Dept. RLC, 6216 West 66th Place, Chicago 38.*



Journal Lubricator

This lubricator is made from a specially designed cotton-and-wool fabric used on other AAR approved lubricators. The fabric has special wicking qualities, will not glaze, and is lint-free, according to the manufacturer. The lubricator is rolled both clockwise and counterclockwise, with a core of Chem-foam JL to keep the fabric against the journal surface at all times. *Seaboard Lubricator & Mfg. Co., Dept. RLC, 303 W. Johnson st., Raleigh, N. C.*



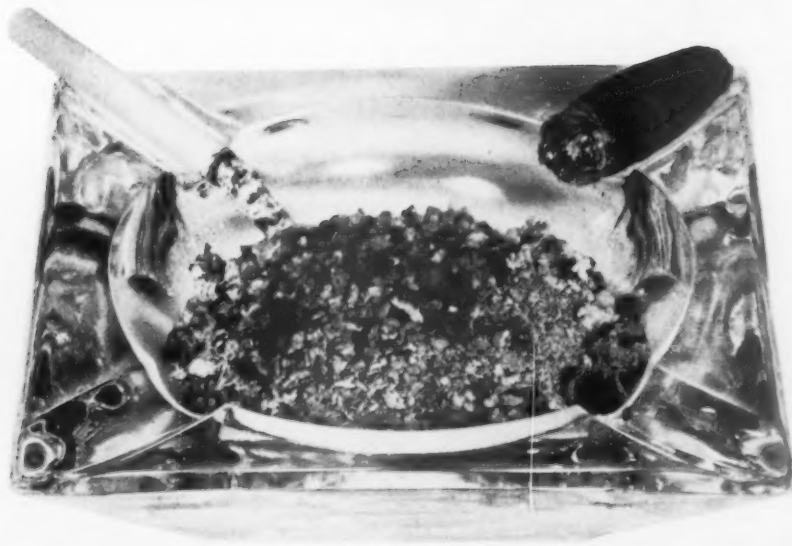
Steel Flooring

A reinforcing channel is the hidden "backbone" of this steel-and-wood combination floor. Designed specifically to eliminate bending or dishing caused by concentrated loads of up to 10 tons, the welded reinforcing channel runs under the full length of each of the floor surface channels.

The material is 147 gage, Republic High Strength "50" steel, which permits a weight saving of 35 per cent over a comparable floor of common steel.

In this combination of two hat sections, the top section has a width of 8 3/8 in. and a depth of 1 3/4 in., although 2 3/8 in. is available. The inner section is welded to the underside of the upper portion by the flanges and produces a combination of a box section and two Z-sections. The 3/4-in. flanges

(Continued on page 24)



ELECTRIC-INCINERATING TOILET FOR RAILROAD USE NO MORE CARE THAN AN ASHTRAY!

The cigar and cigarette are real, but the ASH in the picture is from the ashpan of an INCINOLET—after two days of use.

INCINOLET is a waterless electric-incinerating toilet. INCINOLET works as a complete disposal plant, reducing all human waste to odorless, inorganic ASH — bacteria free.

INCINOLET eliminates waste disposal problems with scientific sanitation by electric incineration. It is the first sanitary toilet designed specifically to rid railroads of maintenance demands common to the chemical storage bucket and water closet. INCINOLET is perfectly adaptable for use on diesels, cabooses and work cars, and is easily and quickly installed by regular railroad maintenance men.

*For complete details write Dr. E. Bayne Blankenship, president
or . . . railroad representative: Ajax-Consolidated Company*

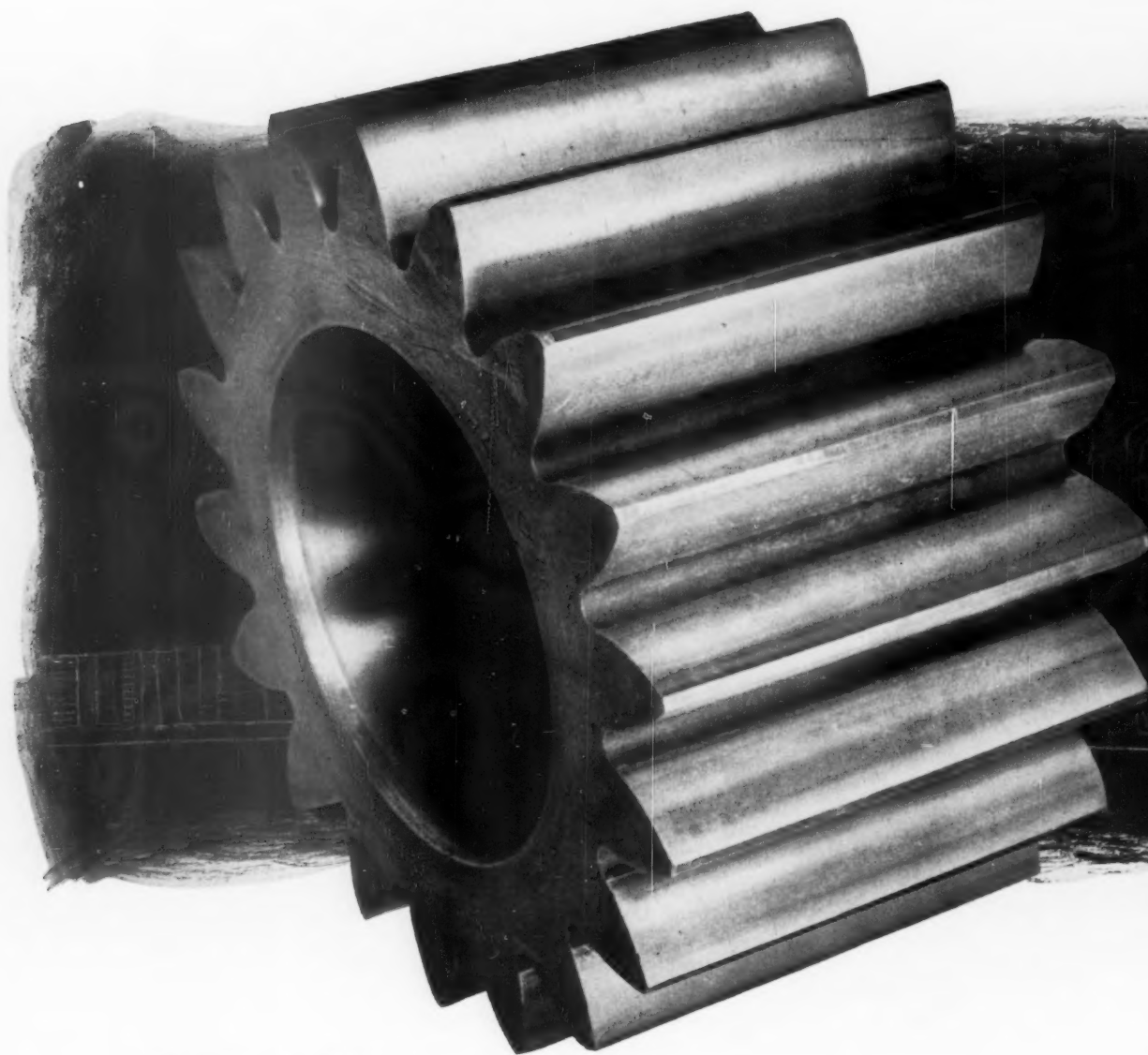


INCINOLET — waterless toilet

RESEARCH PRODUCTS MANUFACTURING COMPANY

P.O. BOX 35164 • DALLAS 35, TEXAS

Like New After



PROOF

Unretouched photo shows typical traction motor pinion gear from Lehigh and Hudson River Railway Company locomotive after 8 years of service.

Commenting on this, W. E. Burns, L and HR Mechanical Superintendent, says:

"To date, all axle gears and traction motor pinion gears have shown very little wear. This proves to us the excellent lubricating properties of Sinclair Jet Lubricant TM."

8 Years Service



SINCLAIR JET LUBRICANT TM CUTS COSTLY GEAR WEAR

Sinclair Jet Lubricant TM is a rich, rugged Pennsylvania oil that cushions traction motor gear teeth, prevents undue wear and reduces excessive electrical loads. Now in use on over 100 American railroads, it's unsurpassed for heavy-duty work in Diesel traction motor gears.

Available in 1-lb and 2-lb Poly bags; also in 4-lb Poly bags for recharging at overhauls; in 35-lb pails; 120-lb and 400-lb drums.

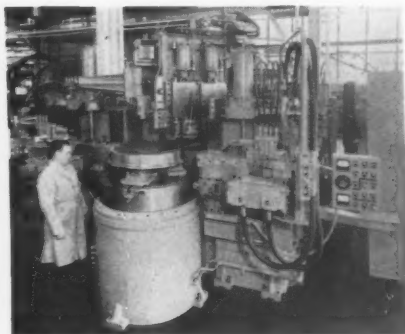
For additional information, contact Sinclair Refining Company, Railway Sales, 600 Fifth Avenue, New York 20, N. Y. • Chicago • St. Louis • Houston

SINCLAIR RAILROAD LUBRICANTS

WHAT'S NEW IN EQUIPMENT—Continued from page 20

support the wood throughout the length of the floor plank. The system uses clips instead of permanent welds to hold the floor sections to the underframe of the car. Nelson studs secure the 2- x 4-in. wood strips.

The first installation of this flooring was made in conjunction with an installation of the Youngstown Steel Car "Safe Cargo" wall anchors (RL&C, June 1958, p. 18). Republic Steel Corporation, Dept. RLC, Republic Building, Cleveland.



Vertical Wheel Lathe

This tracer-controlled, high-speed, vertical lathe with mechanically-clamped, insert-type, carbide tools finish-turns car wheels from the rough cast or forged condition. The machine is designed to process wheels from 33 to 42-in. in diameter in a 2¼-min. machining cycle.

A 125-hp variable-speed drive provides the necessary adjustable 20 to 80-rpm table speeds. Hydraulic controls include six hydraulic pumps driven by one 15-hp and one 20-hp motor, a tracer system operated by a template-controlled servo valve with a mechanical follower, and hydraulic cylinders that operate a three-jaw chuck on the inside of the rim, and expanding arbor holddown in the axle hole on the work table.

The work table is driven through a multiple V-belt drive, spiral bevel gears and helical gears. The tree compound slides carry tool blocks with minimum overhang. The compound slide above the work table carries two tool slides. One of the slides has two tools that rough and finish-face the hub. The other has three tools, two that rough and finish-face the rim and another that provides the rim radius.

The machine has provisions for quick-change settings for machining wheels to the next smaller tape should porosity or surface cleanup problems be encountered. Turning is performed dry at speeds of 250 ft per min. Turning and facing operations are performed at feed rates of .065-in. per revolution.

The 10-ft high machine occupies a floor space approximately 15 ft by 17 ft and weighs about 55 tons. Snyder Tool & Engineering Co., Dept. RLC, 3400 E. Lafayette, Detroit 7, Mich.



Lightweight Hoists

The coil-chain Coffing Quik-Lift hoist models range from ¼-ton to 2-ton capacities and feature mechanically interlocked pushbutton controls. For pulling a trolley mounted hoist, the control cord incorporates a strain cable. The plastic control station is shaped as a pistol grip. Control circuits are only 115 volts, regardless of hoist voltages.

The aluminum housing is constructed in sections to permit easy access to all parts. Coffing Hoist Div., Duff-Norton Company, Dept. RLC, Danville, Ill.



Pneumatic Loading Device

The pressure bulkhead type of freight-car lading device consists of a series of movable, inflatable walls. Suspended from tramrails on the ceiling of the car, the cushion-like bulkheads can be interspersed at intervals through a merchandise lading and are inflated with low-pressure compressed air to take up the remaining empty space.

As the load compresses and shifts during transit, the air walls immediately take up additional space that develops. Pressures

are equalized through the manifold formed by the air-delivery system to which all the bags are connected with quick-disconnect fittings.

The air cells are similar in structure to the "air dunnage" units sold by U. S. Rubber. Because the components of the system are parts of the car, it is expected there will not be losses experienced with standard air dunnage and with some mechanical loader components.

The pneumatic system, developed by Westinghouse Air Brake, operates on extremely low pressures and is not connected to the car's brake system. These pressures are very low. Typical values are ½ to ¾ psi, with a maximum of about 1 psi.

A reservoir under the car is charged from a trackside air supply to a pressure of 80 psi or more. From this, air passes through a self-lapping Controlair valve which produces the operating pressure of 1 psi or less. Additional air is added or air is bled from the inflatable walls by the valve to maintain the pressure setting exactly. Visual Plant Layouts, Dept. RLC, Oakmont, Pa.

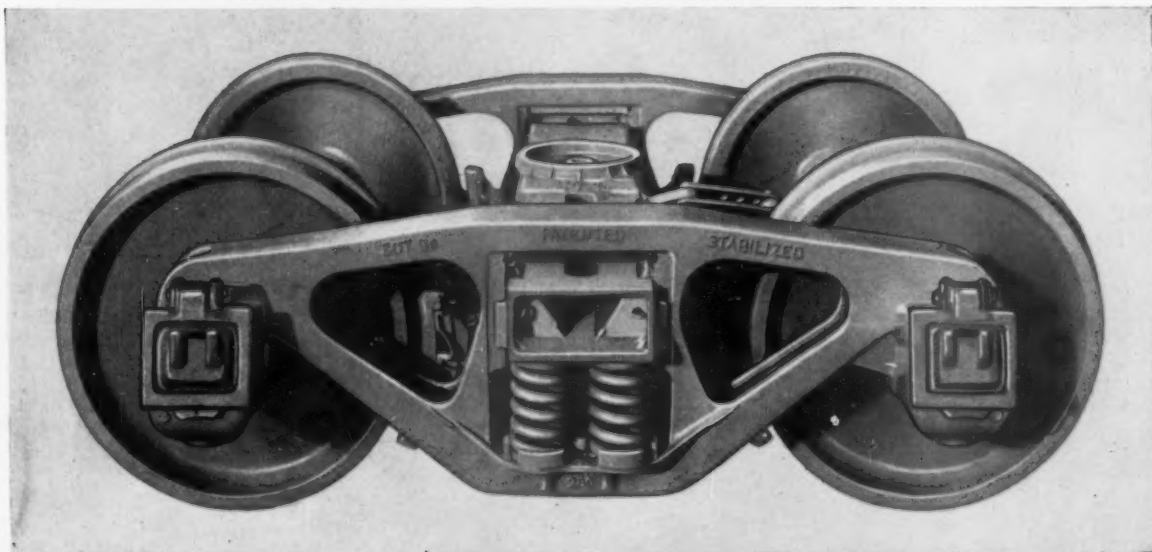


Torque Control Unit

The "One Shot" Clutch, a torque control unit, adds less than 1 in. to overall tool length. A unique ball and roller design gives the greatest possible accuracy in controlling torque limits within a range of 20 to 100 in.-lb. In operation, the clutch jaws disengage the instant the predetermined torque limit is reached, stopping the rotation of the driving spindle which remains inoperative as long as the tool is held in contact with the work. Once released, the tool automatically sets itself for the next driving operation.

The clutch is available in a full range of Buckeye fastening tools and is adaptable to any existing Buckeye A Series fastening tool equipped with adjustable clutch. Conversion (Continued on page 74)

MODERN FREIGHT CARS BEGIN WITH



BARBER

STABILIZED TRUCKS

**MORE THAN 475,000 CAR SETS
OF SM-O-O-O-O-THER RIDING
BARBER STABILIZED TRUCKS SOLD**

Standard Car Truck Company, 332
S. Michigan Ave., Chicago 4, Illinois.
In Canada: Consolidated Equipment
Company, Ltd., Montreal 2, Quebec.

A NEW FIBER GLASS INSULATION

developed specifically to meet the requirements of the

TRANSPORTATION INDUSTRY



- Highly efficient
- Moisture resistant
- Vibration resistant
- Durable
- Extremely lightweight
- Easily installed

WHAT IS TRANSULITE?

Transulite insulation is a lightweight, resilient blanket made of extremely fine glass fibers bonded together with a thermosetting resin.

It's *unique* because a specially developed binder minimizes moisture pick-up, even under severe operating conditions.

WHAT IS ITS BACKGROUND?

Transulite's background is the research laboratories of L-O-F Glass Fibers Company, where some of the most efficient thermal insulations known have been developed.

These insulations are widely used by the automobile, aircraft, original equipment, industrial construction and home building industries . . . also used in appliances, air conditioning systems, trucks and trailers, metal buildings, mobile homes and many other places.



Transulite



WHAT ARE ITS ADVANTAGES?

Because Transulite is especially designed for the transportation industry it offers:

Superior thermal performance—one of the most efficient on a heat-resistance-to-weight ratio.

Superior resistance to moisture—when tested for 14 days in a humidity cabinet—such as used in the railroad industry for refrigerated cars—total moisture pickup by absorption and adsorption combined was below the maximum permitted by the specifications.

Superior resistance to vibration—the most troublesome over-the-track operating conditions present no hazard. Transulite holds its position . . . resists sagging or settling when properly installed.

Superior durability—protects your long term investment because the inorganic glass fibers will not burn, rot or sustain rodents and vermin.

Transulite's extreme light weight adds very little to overall unit weight . . . permits increased payloads . . . makes it easier to install! Rolls are pleasant to handle and are compressed to require less storage space.

WHERE IS IT USED?

Transulite performs best where the requirements are the most exacting. Its superior thermal performance and resistance to moisture make it the ideal insulation for refrigerated cars.

Transulite, as well as Super-Fine, Microlite and Microtex, other products of L·O·F Glass Fibers Company, answer insulation problems for passenger cars, box cars, tank cars and cabooses.

Available in thicknesses and densities to meet specific requirements. Widths up to 120".

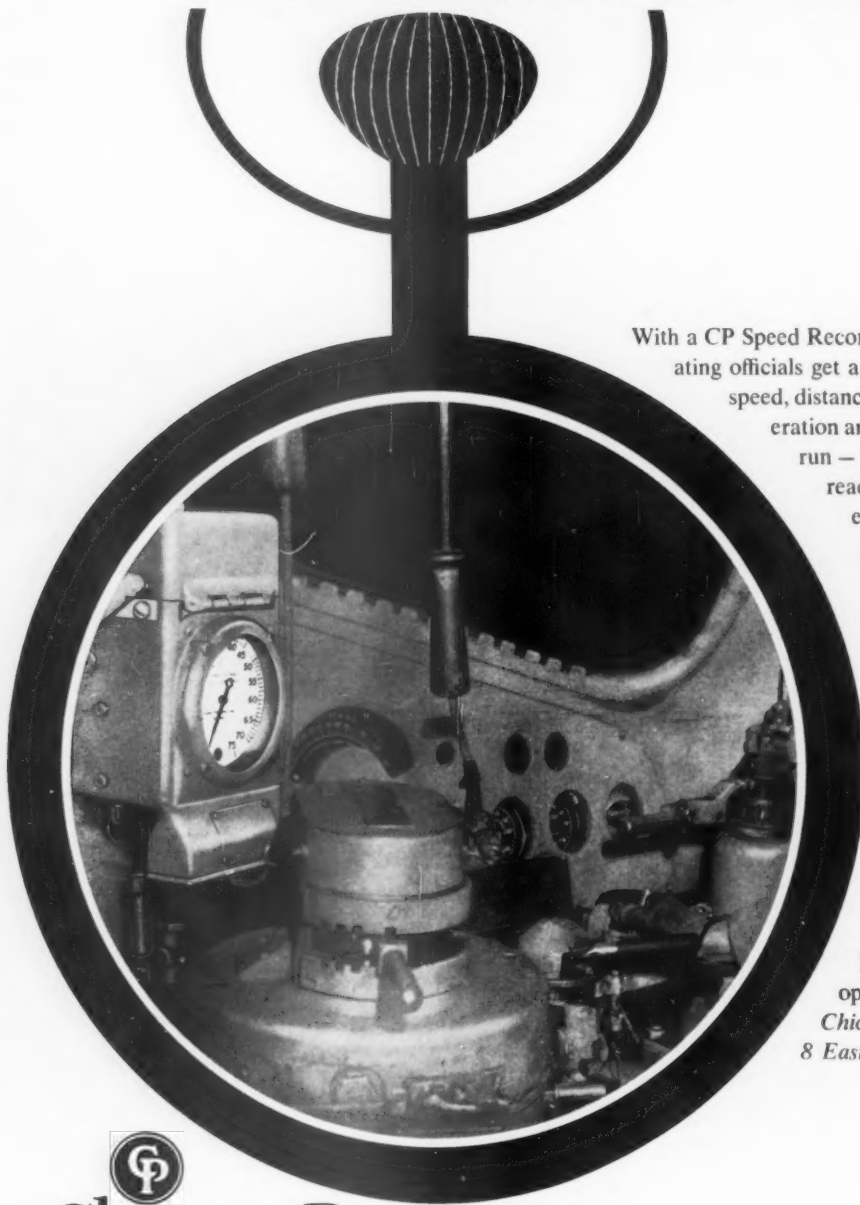
For more information about Transulite and how it helps to solve insulation problems, write to: *L·O·F Glass Fibers Company, Dept. 56-98, 1810 Madison Avenue, Toledo 1, Ohio.*

L·O·F GLASS FIBERS COMPANY

TOLEDO 1, OHIO

from departure — to arrival

CP SPEED RECORDERS GIVE PRECISE PERFORMANCE RECORDS



With a CP Speed Recorder installed in the cab, operating officials get a permanent record of running speed, distance traveled, acceleration, deceleration and wheel slippage for the whole run — while the engineer has easy-reading indication of exact speed every second the locomotive is in motion. CP Recorders and Indicators are available for road locomotives in two High Speed ranges: 0 to 75 MPH and 10 to 120 MPH. Two Slow Speed Recorders are also built for use on hump yard approaches and terminal areas. These models are rated 0 to 15 MPH and 0 to 35 MPH. For dual-controlled locomotives CP Recorders can be furnished with an auxiliary Remote Speed Indicator for the opposite side of the cab.

*Chicago Pneumatic Tool Company,
8 East 44th Street, N. Y. 17, N. Y.*


Chicago Pneumatic

SPEED RECORDERS AND INDICATORS • STATIONARY AND PORTABLE AIR COMPRESSORS • PNEUMATIC AND ELECTRIC TOOLS • HYDRAULIC RIVETERS



20-year overhaul of Reading "Crusader" proves...



beauty of stainless steel is more than skin deep

In 1937 the Reading Railroad put the all-stainless steel "Crusader" in service on the New York to Philadelphia run.

Twenty years and almost two million miles later, they brought the "Crusader" in for its third complete overhaul. The condition of its stainless steel completely justified the confidence shared by the Reading and the Budd Company, the "Crusader's" builders, in nickel-containing stainless as a highly practical material for railroad car construction.

**Condition shows
it's inexpensive, too**

In the photos above, taken during

overhaul, you can see for yourself the excellent condition of the "Crusader's" stainless steel exterior skin and structural members.


No scale. No corroded parts to be replaced. Accumulated dust under the sheathing was easily removed by scraping. Sheathing itself was restored to original condition merely by wiping. With only this minor maintenance, the "Crusader's" stainless steel looks — and is — as good as new, as modern as tomorrow!

**There's more to stainless
steel than meets the eye**

In addition to such permanent resistance to corrosion, and lasting good

appearance, stainless steel has a high strength-to-weight ratio. Permits lighter cars, important savings in fuel costs. And builders find that its ductility and weldability permit fast, simple fabricating methods... economical production.

"Nickel Alloys in Railroad Equipment," a 32-PAGE BOOKLET, describes how nickel-containing stainless steels and other nickel alloys can lower operating and production costs and improve safety factors in rolling stock, locomotives and trackwork. For your copy, just write Inco.

The International Nickel Company, Inc.
67 Wall Street  New York 5, N. Y.

INCO NICKEL
NICKEL ALLOYS PERFORM BETTER LONGER

It's a fact...

that MAGNUS R-S JOURNAL STOPS
can cut total hot-box costs
to less than
1 cent per car per day!



*Operating experience with more than
5,000 freight cars proves that Solid
Bearings and Journal Stops are the
low-cost solution to the hot-box problem*

Railroads using low-cost solid bearings and R-S Journal Stops today average over 6,000,000 car miles per hot box. Conservatively, new users of R-S Journal Stops can increase hot box mileage 10 times — can cut hot box costs to a tenth of current costs on similar cars in similar service. That means less than $\frac{1}{3}$ cent per car per day to cover all costs associated with bearing road failures.*

That's just one of the facts about R-S Journal Stops, proved now on over 5000 cars in service. Essentially, they stabilize the bearing assembly, help provide uniform, uninterrupted oil film lubrication, give the solid bearing a chance to work at optimum efficiency.

Results: you double bearing life, reduce wheel flange wear, cut necessary service attention, prevent dust guard damage — in short, save on truck maintenance all along the line. This reduced maintenance alone will save you enough to pay for the Stops in 3 years.

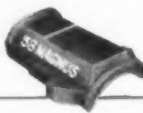
And with R-S Journal Stops, you still have all the other advantages which low-cost solid bearings bring to railroad rolling stock. You can take the maximum load, make the fastest schedule. Lading gets the smoothest ride. You save excess dead weight and get lowest possible running resistance in pounds per ton. Best of all, you'll be sure of the kind of bearing performance you want at a price you can afford to pay. Write us for all the facts. Magnus Metal Corporation, 111 Broadway, New York 6, New York; or 80 E. Jackson Blvd., Chicago 4, Illinois.

*Cost based on data compiled by the Mechanical Division of the Association of American Railroads in 1955.

MAGNUS

Solid Bearings

*Right for Railroads
...in performance...in cost*



MAGNUS METAL CORPORATION *Subsidiary of* **NATIONAL LEAD COMPANY**



Material storage area is paved and has sufficient area so that items can be segregated and spaced for easy handling.

Spot Repair Facility Will Pay for Itself in a Year

Its \$98,000 investment at Macon is estimated to save the Central of Georgia \$116,000 annually

THE BIGGEST SINGLE FACTOR in the annual \$116,000 saving produced by the new light car repair facilities at Macon, Ga., was summed up by D. Marshall, general car foreman, "In the past we would let the men go to the trouble but now we let the trouble come to the men." This is all possible because of \$98,000 which the Central of Georgia has spent during the past two years in relocating and reequipping its Macon rip track. The new "spot" repair facility is located between the receiving

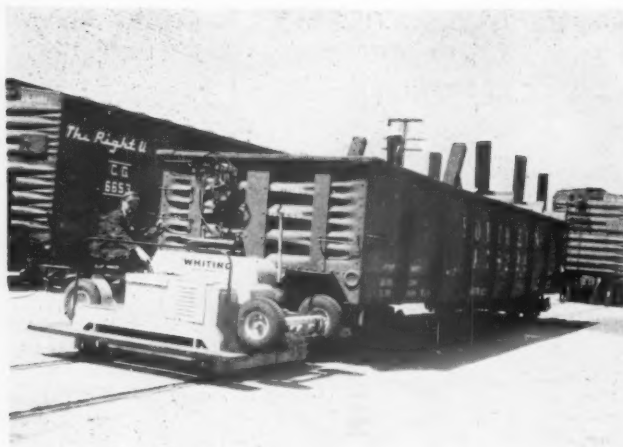
and departure tracks, and the classification yard at Macon's West yard.

While placing it so strategically, the Central of Georgia made sure there was adequate space, not only for cars and work areas, but also for the convenient storage of materials and for the location of necessary service buildings. This railroad has been a pioneer in mechanizing and modernizing its light repair tracks.

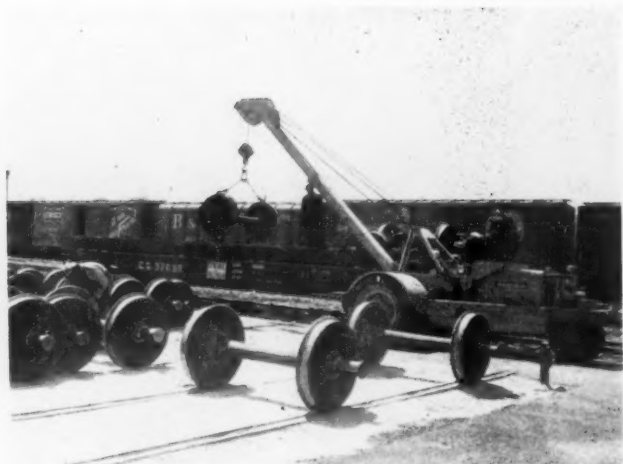
In 1954 the operation at Columbus, Ga., was modernized (*RL&C, Sept. 1954 p. 54*). This was followed two

years later by another modernization at Atlanta (*RL&C, May 1956, p. 60*). The basic feature of these earlier installations, used again at Macon, is the assignment of two tracks for repair work.

All work is done on the cars spotted on one track while it is "blue-flagged." During this time, no work of any kind is done on the other track so that switching crews can kick bad-order cars into it as inspectors find them. After all cars on the first track have been repaired, it is opened so that these cars can



Trackmobile moves cars in the repair area. Broad paved areas facilitate its operation. Earlier CG installations used car pullers.



Wheel storage tracks are numerous enough so that there need be no mixing of wheel sizes and types.

be moved out; and the track will become available for other bad orders while the car repair force then confines its operations to the second track. The "spot" system is used exclusively with each car moved up to a single work area.

While these features are common to all of the revised Central of Georgia car repair installations, the Macon facility incorporates a number of new ideas. Some of these changes can be justified because Macon is the largest yard on the CG and the volume of work there makes possible equipment which could not be justified at other sites. The "spot" where men and tools are located is an open-sided shed 70 ft wide and 100 ft long. The two tracks pass through it on 40-ft centers. Earlier installations had no such protection and it is expected that elimination of work interruptions due to bad weather will save \$10,000 annually.

Previously, the Central of Georgia has used winch-type car pullers for moving cars once they were switched to the repair tracks. This time, a small Trackmobile was purchased to do the job. Roadways and work areas around the repair tracks are paved and this simplifies the Trackmobile operation. At the

same time, it makes easier the movement of car parts from storage to the work areas. A crane truck does this materials handling.

A completely equipped wood working shop included in this installation makes possible lining and flooring repairs for cars which are bad ordered for other reasons. The first few weeks of operation showed that approximately 15 per cent of the cars handled could be given lining and floor repairs which would have otherwise required moving them to the car shop.

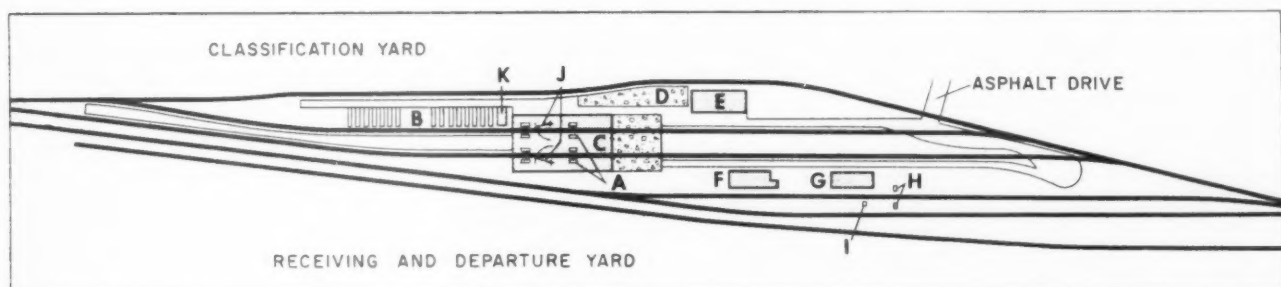
Because of the number of cars handled and the relatively uniform spacing of train arrivals and departures, a consolidation of car repair and yard inspection forces was not attempted. Spasmodic train movements in its smaller yards have made possible a combination of these two work groups with large savings in labor costs.

Repair Shelter

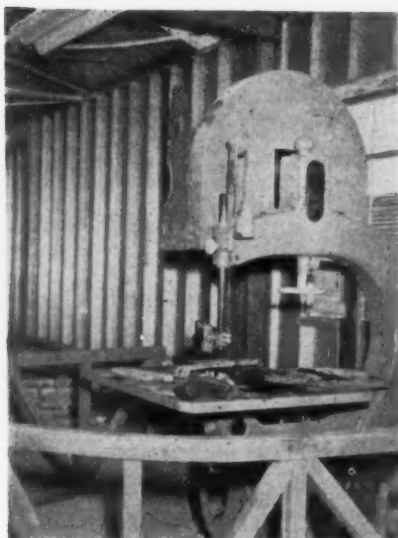
The 70 by 100 ft shed is located over a concrete-paved area. Each of the two tracks is equipped with reinforced jacking pads. While earlier Central of Georgia tracks had truck disassembly

hoists mounted from stationary overhead tramrails high enough to clear any freight car, the hoists at Macon are mounted on a tramrail which forms the boom of a pedestal crane. This tramrail will not clear a car and it is swung from over the track when cars are moved through. In use, the unsupported end of the tramrail rests on a stanchion on the other side of the track. These pedestal cranes were built by the Central of Georgia using Cleveland arch beams. Each is equipped with two 1,000 lb electric hoists and one 2,000 lb hoist. Stationary tramrails would have required a much higher roof.

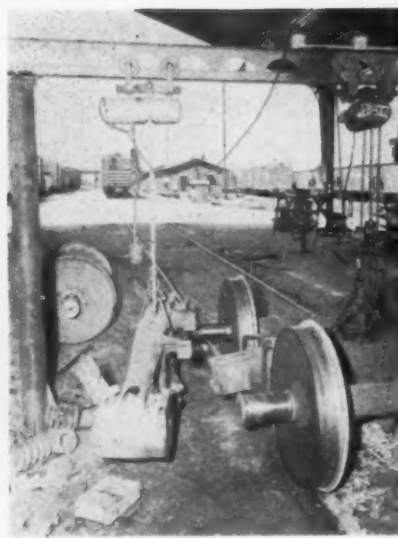
The aluminized tin roof has eight corrugated-plastic skylights built into it. Night lighting is provided by two rows of fluorescent lights on each side of each track. Flood lights illuminate all of the outside work and storage areas. Air and electrical outlets are spaced along each track in recessed boxes with hinged lids which close flush with the platform. On the paved areas adjacent to the shed are all of the car parts, located so that they can be readily reached by the shop crane track. In addition to the two tracks passing through the shed, a third track is assigned to the adjustment of pulp-



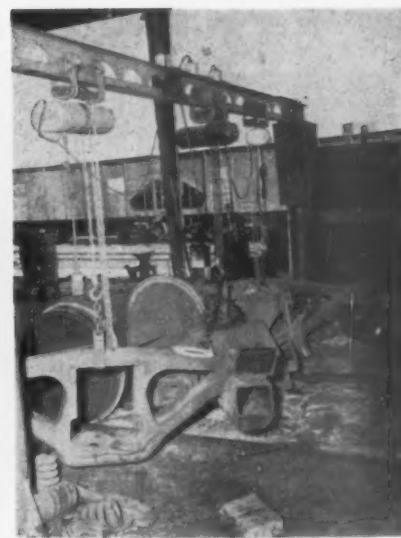
Large light repair installation was based on previous experience with such facilities and includes "A" jacking pads, "B" mounted-wheel storage, "C" covered work area, "D" car parts storage, "E" lumber storage and planing mill, "F" office and air brake shop, "G" washroom, "H" pulpwood adjuster, "I" car puller, "J" mast crane, "K" brass and brake storage. Tracks hold 20, 24 and 11 cars from top to bottom.



Woodworking tools and inside storage make possible lining repairs.



Crane tramrail must be supported by this post when being used.



Pedestal crane with its three hoists simplifies truck tear down.

This Equipment Was Purchased

- 1 Trackmobile, Whiting Model 2TM
- 1 Crane Kar with telescopic boom, 10,000 lb. Model "AX"
- 1 Pipe Master, Oster No. 52
- 1 Cut-off saw, Heston & Henderson 16-in. Model 55
- 1 Surfer, 18-in. x 6-in., Yates-American Model J-180
- 1 Band saw with tilting table, 20-in., Yates-American Model J-120
- 1 Jointer, 8-in. Yates-American Model J-13
- 1 Pedestal grinder, Cadet Model No. 24FAS
- 2 Water coolers, Westinghouse Electric, Model WAC-2
- 2 Electric hoist, 1,000 lb., Comet Model HEC-F
- 4 Electric hoists, 2,000 lb., Comet Model HEC-L

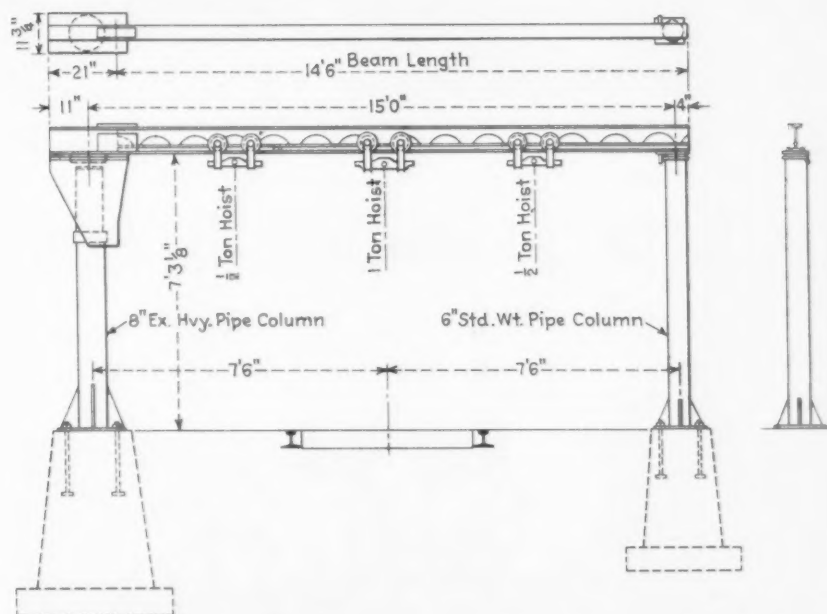
wood loads. It is equipped with one of the Central of Georgia's now familiar hydraulic pulpwood adjusters.

To produce the savings possible by making lining repairs, it was necessary to equip the shop with wood working machines and lumber storage. They are located in a prefabricated steel building. Two other prefabs were used. One is the office and air brake building and the other is used for a locker room.

Labor Force

This light repair track is staffed by two shifts daily, seven days a week. A foreman, four carmen, one apprentice and one helper comprise the first shift crew. A foreman, two carmen and a helper work the second trick. The foreman on each shift also supervises the train yard inspectors. These inspectors do not normally work as car repairmen because the arrival and departure of trains is fairly uniform and they can be used continuously in the yard. If there is idle time, these inspectors adjust pulpwood loads.

Since it went into operation, this



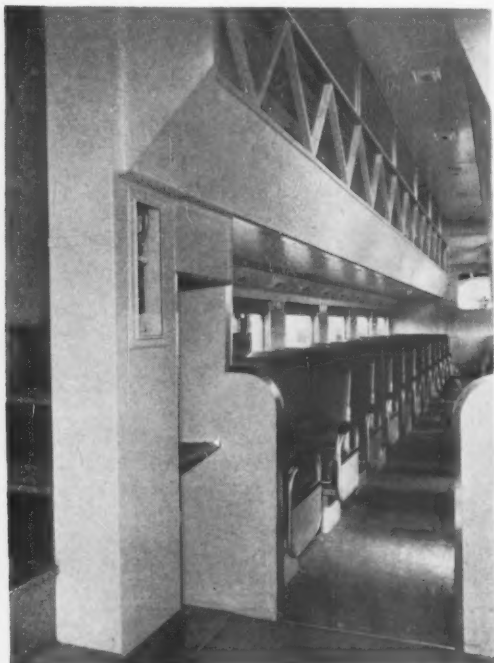
Cleveland tramrail is used to construct pedestal crane. The crane is then fitted with three hoists to make possible the disassembly of trucks.

track has been making repairs to from 35 to 45 cars on the first shift each day; and between 5 and 10 cars are repaired on the second shift. Freight car repairs are made rapidly enough that frequently the cars can be forwarded in the trains to which they originally assigned. With an average repair time of about 4 hr, the saving in car delay is often 24 hrs or more.

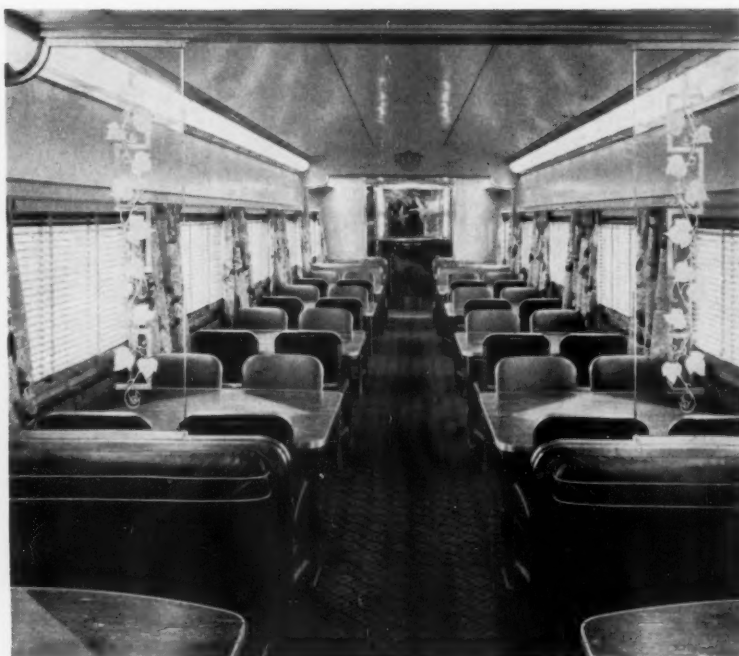
An estimated saving of \$60,000 per year is possible because increased productivity enables the Central of Georgia to equalize A A R billing and repair card accounts. This productivity also saves \$16,000 per year in per diem.

Another \$20,000 in per diem charges is saved because cars no longer need to be moved to the repair shop for lining and flooring repairs. The strategic location of this facility—in the middle of the classification yard—makes possible a saving in switching costs estimated to total \$10,000 annually. The shelter now makes it possible for work to go on continuously even during bad weather and this steady production is worth another \$10,000 yearly according to Central of Georgia estimates. Increased productivity and reduction in per diem and switching charges produce the total saving estimated to be \$116,000.

To Refinish Cars Like These . . .



Two-color gallery car interiors get complete roller paint job in about 100 hrs. Taping of trim and masking is eliminated



Interiors of many of the Zephyr cars are repainted with rollers. Older diners are also repainted this way even though they have three-color paint scheme.

The Burlington Now Rolls Its Paint

For many passenger cars, this method is faster and cuts both labor and material costs at Aurora shop



Paint rolled on Burgess metal over air conditioning ducts does not clog holes.

IN THE AURORA, Ill., shop of the Chicago, Burlington & Quincy, interiors of the Zephyr trains, suburban gallery coaches and many other passenger cars are given two coats of paint with rollers. No masking is done, and the railroad estimates it saves about 40 per cent in material, plus three to four days shop time. This painting can be done with the car either under cover or outside. Spraying the interior requires that a car be in a spray wing of the shop building; and makes it impossible to do other work at the same time—either inside or outside the car.

When cars are received in the shop for general repairs, they are blown out, air-conditioning ducts cleaned, and seats removed. A special fluid soap is used to wash ceiling, walls, seat frames and other surfaces. The cars are then dried.

The Zephyr cars require four to six colors and have considerable chrome trim. When sprayed, it was necessary to mask after each color was applied. Where two colors do not join, each was

sprayed and left overnight to dry. Using rollers, each color can be applied separately or simultaneously and no masking is needed. For the spraying method, an average of 8 to 10 rolls of tape and one roll (60 lb) of kraft paper is required for masking, with 12 hr initial taping and 2 hr additional for each coat.

Gallery Cars

The gallery cars, which have two colors and some metal trim, generally get one coat of paint, although two may be given if the condition of the car requires them. Seats and cushions are removed. Car interiors can be completely painted in about 100 hr using rollers. Like the Zephyr cars, considerable masking, taping and preparation necessary for other painting methods, make the use of rollers economical.

The stainless-steel coaches have three colors, and, while some cars are sprayed, the majority are rolled. It depends on the class of repairs and the arrangement of color schemes for walls and ceilings. When light repairs are scheduled, the base and hallways are usually rolled. The Burgess metal over the air-conditioning ducts is generally rolled, because a brush leaves the holes clogged up. It takes about 18 hr per coat to roll the paint on. Rollers are used in dining cars, which have three colors. Rolling these diners gives a quicker job because of the simplicity of side wall and ceiling construction.

Best Rollers

The most effective paint rollers are those 7 in. and 1 in. wide, having mohair pads which give a light stippled covering film. Synthetic semi-gloss interior enamel is used. The paint is carefully prepared and mixed, if necessary, to provide uniform tints. Paint from the can, cut 10 per cent, is good for roller application. The rollers are cleaned by dipping in thinner. The roller pads are left in the thinner can to soak off the paint. This saves time over cleaning spray equipment, with its hose, spray gun and tank.

Considerable paint is saved by using the roller method. In the stainless steel coaches and dining cars, the roller method uses about 5 gal of paint as compared with 9 to 10 gal with the spray method. There is also considerable advantage in using rollers when cars have to be touched up during a layover at the end of a run. Previously, if passageways and sides of cars were soiled, a brush coat was given, resulting in brush marks. One coat of enamel, applied with rollers, dries in about four hours without streaking and gives a much more satisfactory job.

Coordinated Mechanical Meetings in Chicago, September 15 - 16 - 17

The 1958 meetings of the Coordinated Associations will be at the Hotel Sherman in Chicago. Its 1958 meeting will be the fiftieth held by the Air Brake Association. Officers of each association and the Committee of the Coordinated Associations appear below. Programs are on the next page.

Air Brake Association



C. C. Maynard (CNR)
President



J. B. Ball
Secretary-Treasurer



H. L. Hewing (CCIB)
President



E. W. Gebhardt
Secretary-Treasurer

Car Department Officers Association

Locomotive Maintenance Officers Association



F. R. Denney (NOUPT)
President



C. M. Lipscomb (MP)
Secretary-Treasurer



O. D. Teeter (D&RGW)
President



L. H. Peters
Secretary-Treasurer

Railway Fuel & Operating Officers Association

Committee of the Coordinated Associations



T. T. Blickle (AT&SF)
Chairman



J. A. Welsch
Illinois Central



J. H. Heron
Great Northern



J. D. Ristine
Secretary

Programs on Next Page ►

Programs of Coordinated Mechanical Associations Meetings

HOTEL SHERMAN, CHICAGO

Monday—September 15

10 am

Address: Pres. C. C. Maynard.
Address: A. Campbell, president, International Equipment Co.—"Creed of the Rails."
Present Repair Track Maintenance Procedures—Montreal Air Brake Club.
Trends in Air-Brake Shop Facilities—Manhattan Air Brake Club.
Modern Air-Brake Shop Facilities, E. W. Wingate, assistant general air-brake inspector, C&O.

2 pm

Joint meeting with RF&OOA

Address: R. M. MacDonald, director of operation, Board of Transport Commissioners for Canada.

Panel discussion—Train Handling.
Budd Frate Brake—R. G. Stacy, Budd Co.

10 am

Address: Pres. H. L. Hewing.
Report: Construction, Maintenance and Upgrading Freight-Car Equipment.
Address: E. E. Foulks, assistant vice-president-operations, CRI&P.

2 pm

Report: AAR Loading Rules.
Report: Interchange and Billing for Car Repairs.
Report: Wheel-Shop Practices.

Tuesday—September 16

Air Brake Association—Crystal Room

9 am

Basic Operating Characteristics Passenger Car Brake Equipment, St. Louis Air Brake Club.

Effects on Air-Brake Equipment of External Heat Applied to Railroad Equipment for Thawing Frozen Commodities—Central Air Brake Club.

The Composition Shoe Contribution to Modern Railroad Service, P. O. Willaman, Westinghouse Air Brake Co.

Limitations of Pneumatic Air-Brake Control, H. N. Sudduth, New York Air Brake Co.

2 pm

Tour of Electro-Motive Division.

Car Department Officers Association—Louis XVI Room

9 am

Report: Light Repair Tracks and Train-Yard Operation.

Address: L. L. Adams, assistant to vice-president, traffic, United States Steel Corp.
Report: Maintenance of Passenger Car Equipment.

2 pm

Report: Car Lubrication.
Comments: W. M. Keller, vice-president (research), AAR.

Locomotive Maintenance Officers Association—Grand Ball Room

10 am

Address: Pres. F. R. Denney.
Address: T. T. Bickle, general manager-mechanical Atchison, Topeka & Santa Fe.
Report: Diesel Mechanical—Other than Engine.

2 pm

Report: General Diesel Maintenance Subjects.
Report: Shop Equipment.

9 am

Address: C. W. Taylor, director, Bureau of Safety and Service, ICC, Subject: Certain Functions of the Bureau of Safety and Service Affecting Locomotive Maintenance.
Report: Diesel Electrical.

2:30 pm

Tour of AAR Research Laboratory.
Tour of Electro-Motive Division.

Railway Fuel and Operating Officers Association—Bal Tabarin

10 am

Address: Pres. O. D. Teeter.
Report of secretary.
Address: R. Knox Bradford, vice-president-traffic, D&RGW.
Safety film.
Employee Responsibility in Promoting Public Relations, Douglass Campbell, vice-president, NYC.
Progress of Oil-Burning Gas-Turbine Electric Locomotive, C. Shipman, supervisor air-brake instructions, UP.

2 pm

Joint Meeting with Air Brake Assn.

Address: R. M. MacDonald, director of operation, Board of Transport Commissioners for Canada.

Panel discussion—Train Handling.
Budd Frate Brake—R. G. Stacy, Budd Co.

9 am

Radiation Studies of Fuels, Ray McBrien, director research, D&RGW.
Freight Loss and Damage Prevention, L. E. Adams and H. J. Machlitt, investigator freight claim department, B&O.
Railroad Retirement—Social Security.
Panel discussion—Training Operating Personnel on Rule Compliance.

2:15 pm

Progress in Treatment of Fuel Oil, J. J. Wright, director of technical research, NYC.
Impending Legislation and Competitive Transportation Affecting Future of the Railroads, L. W. Horning, vice-president, NYC.
Panel—Economical Utilization of Power.
Treating of Rails Chemically, G. W. Luvisi, manager products development, National Aluminate Corp.

9 am

Elections.
Malfunctions and Remedies of Air Brake Equipment—Pittsburgh Air Brake Club.
Question Box.
Committee reports.

9 am

Report: Air-Conditioning Equipment, Operation and Maintenance.
Report: Maintenance and Servicing of Mechanically Equipped Refrigerator Cars.
Report: Painting—Modern Methods in Finishing Railroad Equipment.
Miscellaneous reports.
Election of officers.

9 am

Report: Diesel Engine Maintenance.
Report: Diesel Material Reclamation.

2 pm

Report: Steam Generator Maintenance and Water Treatment.
Report: Fuel and Lube Oil.

9:30 am

Planned Supervision—Personnel Selection and Training, N. P. Patterson, superintendent personnel, PRR.
Panel discussion—Diesel Troubles.

2 pm

Official business.
Duties and Responsibilities of an Operating Officer, E. L. Reeves, superintendent, B&OCT.

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Combustion Characteristics of 'Economy' Fuels

- *Can these fuels be burned without changing engine settings?*
- *Do their qualities vary too much to predict performance?*
- *Can engine settings be changed to burn them more effectively?*

THERE ARE SEVERAL "economy" diesel fuels which are being used or have been considered for use in locomotive diesel engines. Some are low-cetane distillates containing cracked stocks and boiling in the ASTM 2D diesel-fuel range. Others are distillate-residual fuel blends or straight residual fuels having viscosities as high as 3,000-4,000 SSU at 100 deg F. The name "economy" implies that these fuels cost less than conventional 2D fuels.

Much has already been written about the advantages and disadvantages of economy diesel fuels—particularly about their effect on deposits, wear, lubricating-oil contamination, and handling practices. The object of this work was to investigate the combustion characteristics of economy fuels. The specific objectives were to answer the following questions:

1. How does a locomotive diesel run on economy fuels at standard engine settings—those used when running on regular 2D type diesel fuel? A railroad operating a large number of engines might find it desirable to switch over to "economy" fuel in all engines at the same time. However, it may often be inconvenient to alter engine settings on all these engines at the same time.

2. Should changes be made to engine settings to provide the same power obtained with regular 2D type diesel fuel, or the most economical operation with economy fuels? In some cases, these fuels would provide more or less power than obtained with a 2D fuel. This becomes important where fixed load factors and schedules are to be maintained. It may be desirable to alter the engine settings to provide the same power as obtained with regular 2D diesel fuel.

3. Are there differences in the performance characteristics of heavy fuels having similar physical properties but differing in composition and crude source? Residual fuels represent the "dregs" from refining operations, and as such, contain large percentages of complex hydrocarbons which are not easily identified.

The answers to these questions should help the potential user of economy fuels assess their value in his operation. Work was done with two low-cetane distillate fuels and four heavy-fuel blends. While answers are specifically for the fuels involved, they should indicate general performance trends and other factors to be encountered from economy fuels.

These studies were conducted in a laboratory EMD 2-567B two-stroke locomotive diesel engine. It has the same features as the full-scale EMD 567B engines. The governor was rendered inoperative, and the fuelrack settings were controlled by fixed gages. The engine was loaded by a directly coupled generator from which power output was obtained and converted to horsepower. Standard EMD fuel injectors were used.

Seven Fuels

Seven fuels were involved in this series of tests. The 42-cetane 2D type fuel was the base fuel prepared from treated West Coast straight run distillate stocks. The 35-cetane fuel and 30-cetane fuels were blended from West Coast stocks to have similar properties to the 42-cetane fuel except for cetane number and composition. They contained cracked stocks.

Blend A was a 300 SSU viscosity (100 deg F) distillate and residual-fuel blend containing about 17 per cent (volume) of mixed straight-run and cracked light-distillate stocks and 50 per cent of a heavy cracked distillate, the remainder being residual stocks from cracking operations. All of the stocks used were obtained from processing West Coast

crudes. Blend B was made from west coast stocks to be as nearly like Blend A as possible except that it contained straight-run instead of cracked residuum.

Blend C was made to be as nearly like Blend A in physical properties as possible. It contained 20 per cent straight run and cracked distillate stocks and 80 per cent residuum from South American and Middle East crudes.

The heavy-distillate fuel was a 115 SSU viscosity (100 deg F) stock from west coast crudes. Actually, Blend A contained about 50 per cent and Blend B about 33 per cent of this stock.

The ASTM distillation data show that the first three contain lower boiling stocks than the latter four fuels. The boiling ranges of these fuels appeared to have some effect on thermal efficiency. The same lubricating oil was used in all the tests.

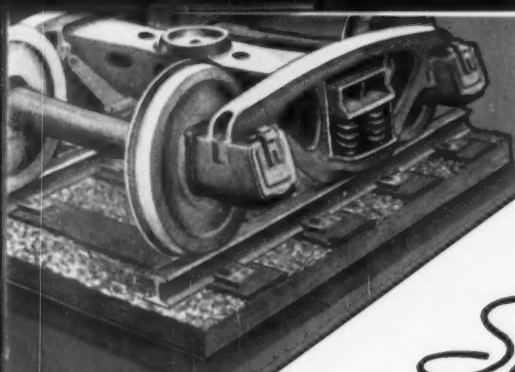
A special fuel system was required to handle the heavy fuels. This system was in parallel with the engine's regular fuel system. Preheated fuel was circulated through heat exchangers and sock filters to a gravimetric fuel-measuring system. Another pump then delivered the fuel through waste-type filters, heat exchangers and sintered stainless-steel filters to the injectors. Controllers maintained constant fuel temperatures and pressures. Means were provided for switching from one fuel system to the other and for purging the heavy fuel system with regular 2D fuel, also used for starting and stopping the engine. This fuel handling system was designed only for the laboratory operation.

Test Procedures

It was impossible to duplicate all field conditions. It was felt that the maximum information could be obtained by investigating the performance of the fuels at constant rated speed, coolant temperature, and inlet-air conditions, and at power outputs close to the rated output of the engine. Other investigators

(Continued on page 41)

This is an abstract of a paper presented by T. A. Kramer, supervising technologist, and D. P. Osterhour, Jr., supervising technologist, both of the Research and Development Laboratory, Socony Mobil Oil Co., Paulsboro, N.J., at the Oil and Gas Power Conference of the American Society of Mechanical Engineers, in Philadelphia.



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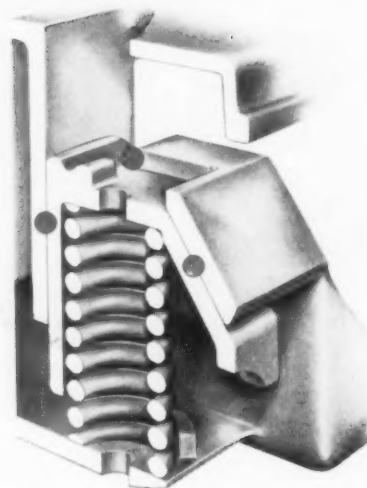
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'Economy' Fuels . . .

(Continued from page 38)

have shown that, at part load, excessive injector deposits can seriously interfere with engine operation with some heavy fuels, but fairly good operation could be maintained at full or rated load. It was not the objective of this program to conduct a deposit study.

The engine operating conditions used in this study were: engine speed, 800 rpm; engine-water temperature, 190 deg F; fuel pressure, 30 to 40 psi; oil pressure 44 to 49 psi; and oil temperature, 230 deg F. Temperatures of fuel to injectors were 150 deg F for heavy fuels and 80 to 100 deg F for distillate fuels.

Each fuel was tested at a range of injector-rack settings at constant rated speed to obtain the following data: power output, specific fuel consumption, peak cylinder pressure, exhaust temperature, and exhaust smoke. In addition, pressure-time diagrams from a dual-beam oscilloscope produced data on ignition delay, time for occurrence of peak pressure, and duration of pressure rise. Observations were made to detect any unusual operations or engine roughness.

The work was under taken in two stages. The first step was a study of the performance of the low-cetane economy distillate fuels as compared to the 42-cetane regular 2D type fuel. The second test series compared the performance of the heavy economy fuels with the 35-cetane economy-distillate fuel.

Performance of the 35-cetane fuel was not the same in each study. This is attributed to differences in the injectors and the condition of the engine. In each study, a given set of injectors was used throughout the testing; but a different set of injectors was used in each program.

All information was obtained in short-time tests. No attempt was made to determine the effect of these fuels on deposits and wear. Long-term laboratory and field tests would be needed to determine the over-all economy resulting from these fuels.

What Tests Showed

For the fuels investigated, operation was perfectly satisfactory from the combustion standpoint at standard fuel-rack setting, injection timing, and rated speed. More power was produced by the economy fuels at a higher specific fuel consumption on a weight basis, but at a lower specific fuel consumption on a volume basis. Peak pressures were up to 100 psi higher, and exhaust temperatures were up to 100 deg F higher than those experienced with the 2D type diesel fuel. The cetane number of the

These Are the Fuels Which Were Tested

	2D Type	35 Cetane	30 Cetane	Blend A	Blend B	Blend C	Heavy Distillate
Cetane Number	42	35	30	27	29	35	26
Gravity, lb per gal	7.18	7.44	7.64	8.26	8.17	7.87	8.10
Heat content, Btu per lb	19,505	19,027	19,135	18,068	18,193	18,620	18,259
Sulfur, per cent	0.47	0.47	0.73	1.25	1.46	2.30	1.10
Viscosity, SSU at 100 deg F	37.0	36.6	39.9	310.3	300.0	319.6	115.4
Pour point, deg F	15	10	10	35	30	5	65
ASTM distillation:							
Initial boiling point..	404	401	440	414	448	358	506
10 per cent	445	470	506	549	526	502	632
50 per cent	504	525	558	683	668	734	685
End point	675	645	664	---	---	---	756

Here Are the Results of the Test

FUEL	RACK SETTING In.	Rhp per Cyl.	FUEL RATE Lb per Bhp-Hr	Thermal Efficiency Per Cent	EXHAUST TEMP. Deg F	PEAK PRESSURE Psi	SMOKE
<u>DISTILLATE FUELS</u>							
Recommended Standard Rack Setting (24/64 in.)							
30 Cetane	24/64	95.3	0.451	0.0590	29.55	908	1145
35 Cetane	24/64	97.3	0.447	0.0594	30.02	895	1127
42 Cetane	24/64	92.9	0.441	0.0615	29.61	886	1115
Constant Power Level (42 Cetane Fuel with 24/64-in. Rack Setting as Basis)							
30 Cetane	26/64	92.9	0.453	0.0592	29.40	878	1122
35 Cetane	25/64	92.9	0.449	0.0594	29.45	882	1120
42 Cetane	24/64	92.9	0.441	0.0615	29.61	886	1115
Optimum Economy Fuel Rack Setting							
30 Cetane	22/64	99.7	0.449	0.0588	29.57	939	1160
35 Cetane	22/64	99.0	0.446	0.0592	29.65	908	1135
42 Cetane	20/64	99.8	0.436	0.0608	29.91	931	1150
<u>HEAVY FUELS</u>							
Recommended Standard Rack Setting (24/64 in.)							
35 Cetane	24/64	92.0	0.442	0.0594	30.3	900	1025
Blend A	24/64	97.4	0.470	0.0569	29.9	965	1080
Blend B	24/64	95.5	0.464	0.0568	30.1	940	1050
Hvy. Dist.	24/64	96.8	0.458	0.0565	30.4	940	1120
Blend C	24/64	93.2	0.460	0.0584	29.8	931	--
Constant Power Level (35 Cetane Fuel with 24/64-in. Rack Setting as Basis)							
35 Cetane	24/64	92.0	0.442	0.0594	30.3	900	1025
Blend A	26/64	92.0	0.472	0.0571	29.6	930	1050
Blend B	26/64	92.0	0.466	0.0571	29.9	900	1025
Hvy. Dist.	26/64	92.0	0.461	0.0569	30.2	900	1095
Blend C	24/64	92.0	0.460	0.0584	29.8	931	--
Optimum Economy Fuel Rack Setting							
35 Cetane	20/64	101.0	0.439	0.0590	30.4	965	1070
Blend A	22/64	101.9	0.469	0.0568	30.0	1000	1100
Blend B	22/64	100.2	0.463	0.0566	30.2	975	1078
Hvy. Dist.	20/64	101.2	0.455	0.0562	30.6	1000	1160
Blend C	22/64	98.3	0.458	0.0582	29.8	966	--

fuel did not appear to be significant. In general, the heavy fuels do not perform quite as well as the distillate fuels. There was no significant difference in the amount of smoke produced.

The simplest way to achieve the same power produced by the 2D fuel is to reduce the fuel rate (increase the fuel-rack setting). At the same power level as the 2D fuel gives, the economy fuels perform in the same manner as described above. By altering the basic injection timing, some gains in economy can be realized with all fuels. Depending upon engine-load factors, there is a different combination of fuel-rack setting and injection timing for each fuel

that can provide even further gains economy.

There are differences in the performance characteristics of heavy fuels having similar properties, but differing in composition and crude source. A small difference in performance was noted for two fuels from the same crude source but differing in composition while a fuel from another crude source produced larger differences. The performance of this last fuel was contrary to what would have been expected from its analytical properties and points out the desirability of running engine tests on such fuels before drawing any conclusions regarding their performance.



Working on a continuing program covering twelve months, the Boston and Maine turned in and received each month four to six locomotives thus reducing out of service time to a minimum. At left is one of the 15-year-old FT freight units. Above, four of the new General Purpose locomotives are shown on Zoar Curve in Western Massachusetts.



50 new locomotives for old

... with a gain of 20,000 horsepower!

The Boston and Maine last year turned in fifty used FT freight locomotives on the purchase of fifty *new* General Purpose locomotives containing certain remanufactured components.

Besides costing considerably less than completely new locomotives, the Boston and Maine gained—from the higher horsepower of each General Purpose unit—a total of 20,000 horsepower, or *the added capacity of eleven additional locomotives.*

How this or similar plans might benefit your road's future can be had in detail from your Electro-Motive representative.

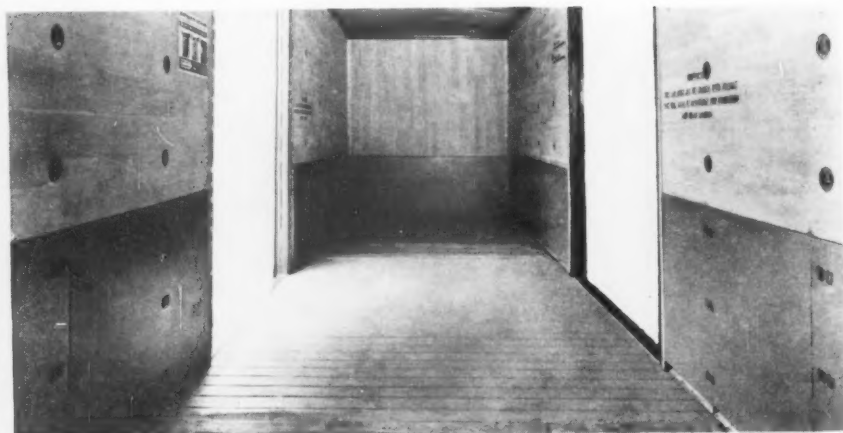


ELECTRO-MOTIVE DIVISION GENERAL MOTORS

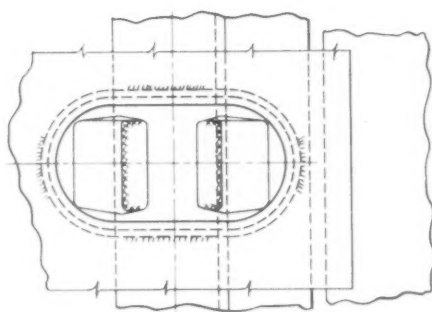
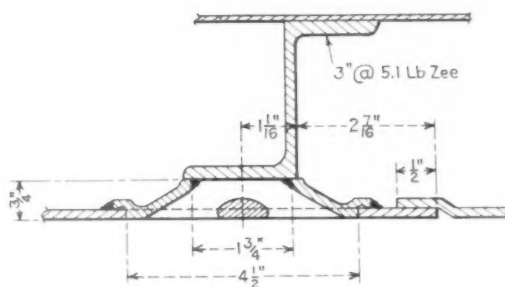
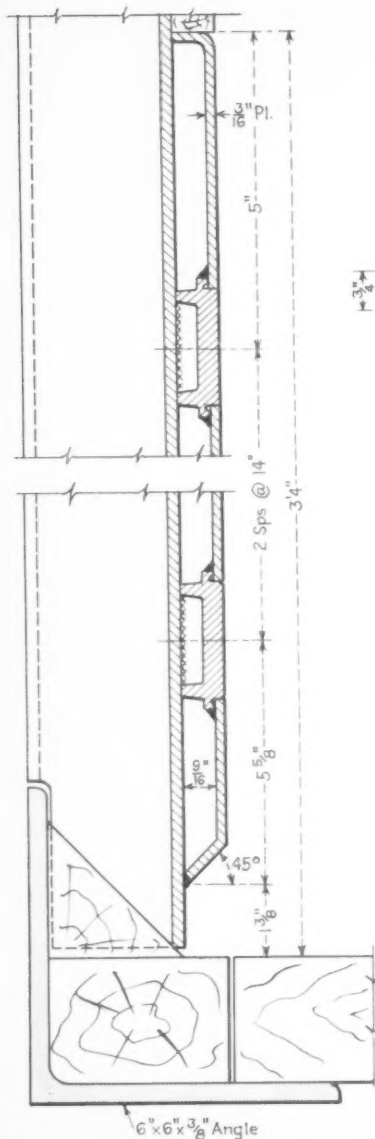
LAGRANGE, ILLINOIS • HOME OF THE DIESEL LOCOMOTIVE

In Canada: General Motors Diesel Limited, London, Ontario

On Its 1,000 Newest Cars . . .



B&O Installs Steel Box-Car Lining



Steel lining and lading strap anchors are combined in the newest B&O cars to make inside surface flush with laminated wood lining used above. The steel lining and steel flooring at the doorway strengthen the car. Inside width is 9 ft 2 in., inside height at sides is 10 ft, and door opening width is 8 ft. These cars have 41.2 lb Z-section center sills. All cars have one-wear wrought steel wheels and 51 have disc brakes.

"NORMALLY there is heavy maintenance with conventional wood lining up to a height of 3 ft above the floor. On these new cars we applied a $\frac{3}{16}$ in. steel lining developed jointly by our railroad and the Youngstown Steel Door Company." That's how F. B. Rykoskey, general superintendent motive power of the Baltimore & Ohio, explained the most unique feature of his railroad's 1,000 newest 50-ton box cars.

These cars have an inside length of 40 ft 6 in., a door width of 8 ft, and an average lightweight of 48,600 lb. They were assembled at the railroad's Du Bois, Pa., shop late in 1957 and early in 1958. The railroad continued its well established practice of using major subassemblies supplied by car builders. Six hundred sets of body material were furnished by ACF Industries and 400 sets by Pullman-Standard.

Above the 3-ft high steel lining, the railroad used $\frac{3}{4}$ -in. thick Nu-Loc laminated wood panels furnished by the Weyerhaeuser Sales Company. By using special A Zee lading strap anchors welded behind punched holes in the $\frac{3}{16}$ -in. steel lining plates, it was unnecessary to use any spacers on the Z-section side posts to bring the surface of the thin steel flush with the heavier wood. Youngstown Steel Door supplied the lining plates, flanged top and bottom, and with the lading anchors welded in position. For application in the car, it was only necessary to weld the anchors to the side posts in the openings through which strapping normally is passed. The lading anchors in the Nu-Loc wood siding are of the conventional MacLean-Fogg type. In the corrugations in the ends of the cars, wooden spacers are used behind the steel lining. To prevent rusting and to protect lading, a non-toxic Neoprene coating was used over the steel lining.

The sides of the car are of welded construction with 5.1 lb, 3-in. Z-sections used as side posts spaced on 3 ft $4\frac{5}{16}$ in. centers. Nailable steel floors are used in the doorway area. Pullman-Standard supplied this flooring for 200 of the cars and the remaining cars are equipped with Stran-Steel flooring. The wood flooring in the ends of all the cars is $2\frac{3}{8}$ -in. thick.

The B&O has applied freight car disc brakes to 51 of the cars. Fifty of these are Buffalo Brake Beam's Brake X installations and the other car has an American Steel Foundries Roto-Frate brake.

In addition to reducing maintenance costs, the steel lining should reduce contamination problems. Between all of the side posts the lining sheets form gussets which materially add to the car's strength.



**LENGTHEN ENGINE LIFE,
REDUCE MAINTENANCE**

Esso Airfil Coating Oil adds outstanding dirt pick-up properties to diesel air intake filters.

Airfil protection is so effective that it pays off handsomely in reduced abrasive wear, lowered repair costs, longer engine life. ¶ Airfil also shows superior wicking qualities. Successive layers of dirt and dust are quickly wetted, exposing a fresh, efficient dirt-retaining surface at all times. ¶ Applying Airfil is simple. It goes on rapidly as a hot liquid and cools to a gel-like solid that retains its consistency at engine-room temperatures. And since Airfil is insoluble in water, it stays on the filters, even in the wettest weather.

It can, however, be readily removed by a hot detergent wash or a steam blast.

Airfil's cost-cutting advantages make it ideal for passenger car air-conditioner filters too. For further information or technical assistance, call your local Esso office, or

contact: Esso Standard Oil Co., Railroad Sales Division, 15 W. 51st St., New York 19, N.Y.

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RAILROAD PRODUCTS

N-S-F[®] Nailable Steel Flooring helps a Progressive Shipper and a Progressive Railroad make safe deliveries

Bowaters Southern Paper Corporation is the largest manufacturer of newsprint in the South. Much of its product is shipped from its Calhoun (Tenn.) mill via the Southern Railway.

Newsprint is a difficult item to ship. If the rolls are scarred or scuffed, torn or dirtied while in transit, damage claims can result. The Southern, living up to its policy of service to shippers, makes certain that boxcars assigned to Bowaters are completely equipped with Nailable Steel Flooring.

Result . . . a satisfied shipper. Every day, 35 boxcars, loaded with newsprint, leave the Bowaters mill. But there has never been a freight damage claim attributable to Nailable Steel Flooring.

"N-S-F is a first class floor for the shipment of newsprint," Bowaters traffic executives agree. "It's always in perfect condition—not too rough to scuff our rolls, not too smooth to cause skidding."

The mutual satisfaction of Bowaters Southern and the Southern Railway with N-S-F means splinter-free flooring that can take any type of lading and can stand up under concentrated fork-truck loads. Its use means less downtime for repairs, more Class A cars in service. No wonder over 60,000 cars have been equipped with N-S-F.

NAILABLE STEEL FLOORING

Originated and sold by—



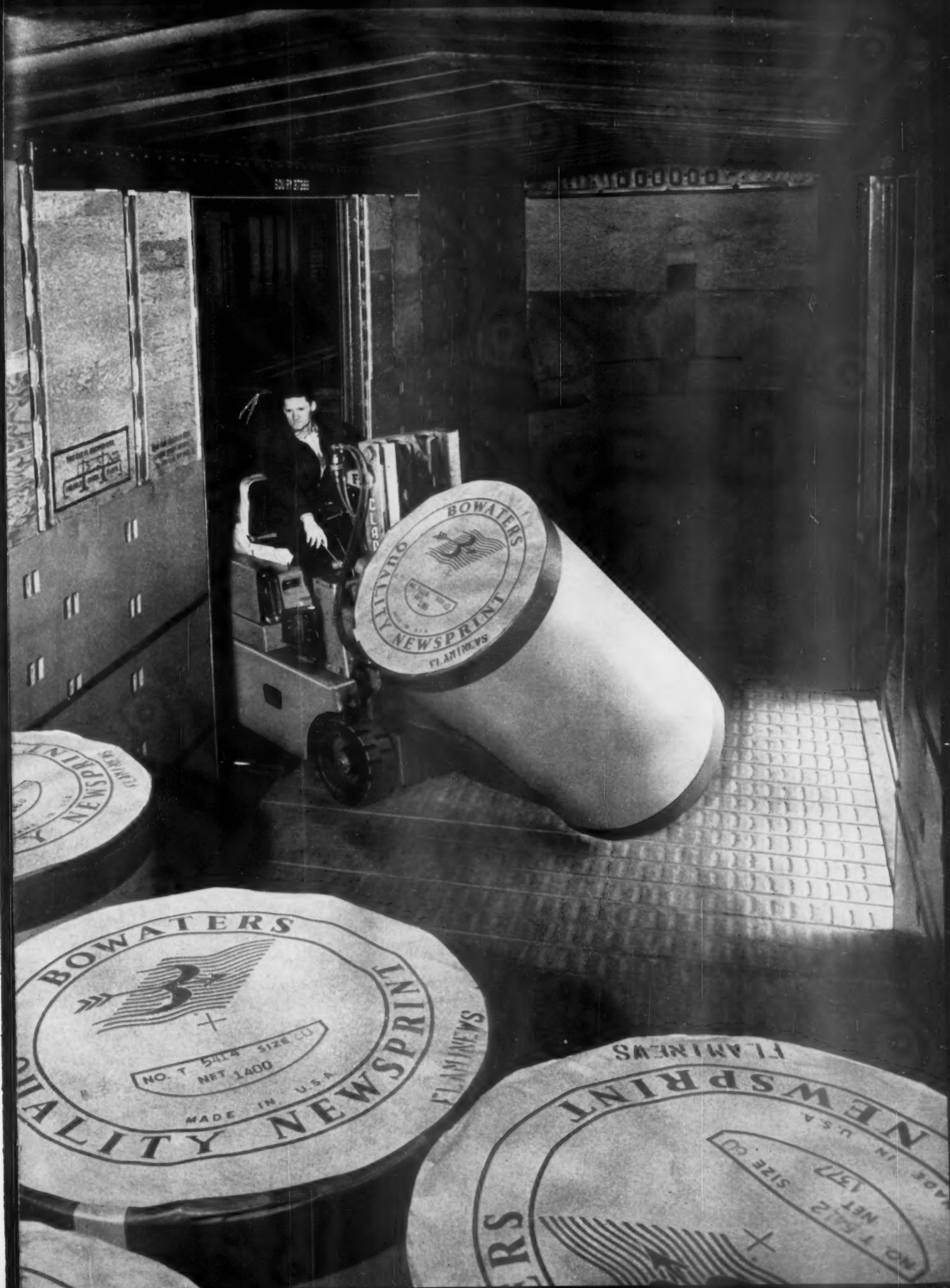
STRAN-STEEL CORPORATION

Dept. L-23 • Detroit 29, Michigan • Division of

NATIONAL STEEL CORPORATION

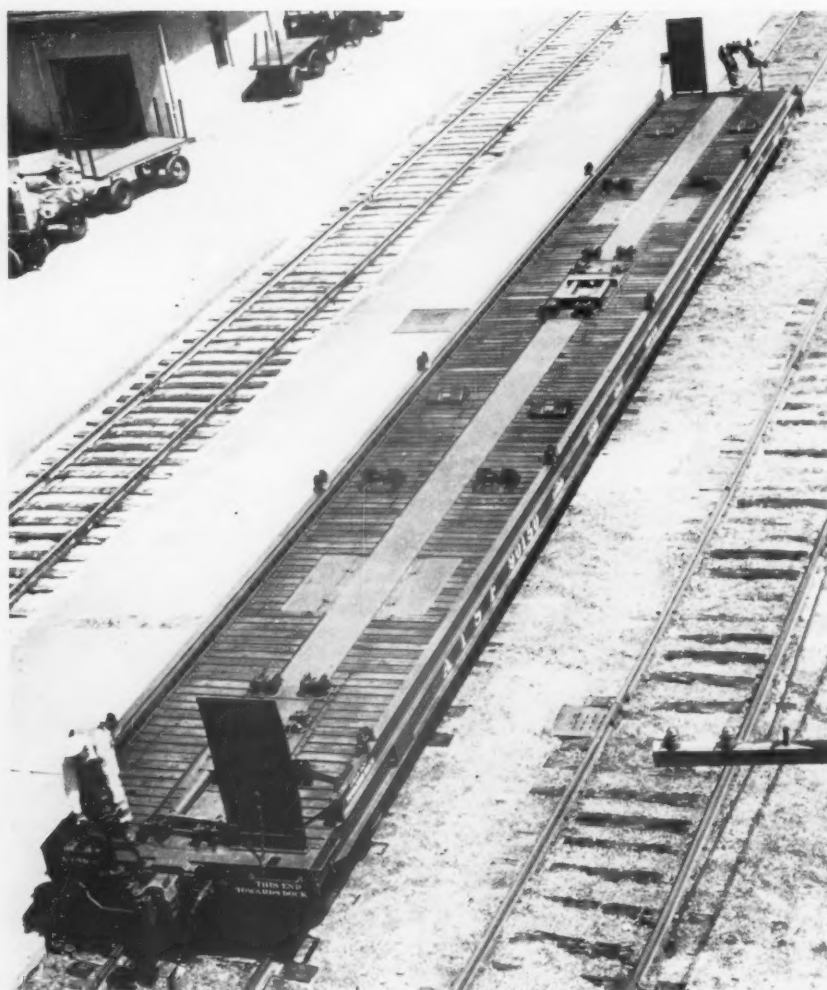
Full information and cost studies on the use of N-S-F in freight cars is readily available from Stran-Steel representatives in Chicago, New York, Philadelphia, St. Louis, Cleveland, San Francisco, Minneapolis and Atlanta. In Canada, N-S-F is made and sold by International Equipment Co., Ltd., Montreal.

This Bowaters Southern fork-truck and its roll of newsprint weighs 5,500 pounds. N-S-F takes this concentrated load easily—and will for the life of the car.





Santa Fe Builds 88-Ft TOFC Cars



Capacity of these cars is 57½ tons but center load limit is 38½ tons.

THE SANTA FE has recently completed 25 flat cars for piggyback freight service. These are no ordinary flats. The all-welded cars have a loading surface length of 88 ft, an overall width of 9 ft 6 in., and are the longest ever built for TOFC service. They were assembled in the Santa Fe shop at Topeka, Kan.

The center sill is constructed of two 30-in., 132-lb LAHT steel, wide-flange beams. Side sills are 12-in., 35-lb channels, on top of which guide rails are secured. The guides are 10-in. I-beams, having 3-in. pipe welded to the webs to protect the trailer tires. The Ride-Control trucks have springs with 3 11/16-in. travel Unit brake beams, one-wear wrought steel wheels, and ABS cartridge bearings for the 6 x 11 journals. The trailer hitch is designed for attachment to the trailer king pin and is located to accommodate two 40-ft trailers with refrigerator units attached to the front ends or any combination of two smaller trailers in present day service. Cable and shock absorber tie-down devices have been tested to hold trailers loaded with 45,000 lb.

Special features of these 88-ft cars include long-travel rubber draft gears, swivel couplers and dual AB brakes. The two hand brakes are the drop shaft type. Even with the hand brake wheel flush with the top of the deck in the down position, the brake can be operated. Four tool and equipment storage boxes, with hinged lids, are located between the center and side sills below deck, two at each end of the car. The truck centers are 76 ft, and the height from the top of the rail to the top of the oak deck is 3 ft 5/16 in. This deck is depressed to make it level with the top of the center and side sill sections. The light weight of the car is 93,200 lb.

the Key to
Successful
Railroading

"IMPARTIAL OBSERVERS"

"REMARKABLY GOOD"

"ALL PERSONNEL WELL PLEASED"

"MAINTENANCE HAS BEEN ALMOST NIL"

"CONVINCING PROOF"

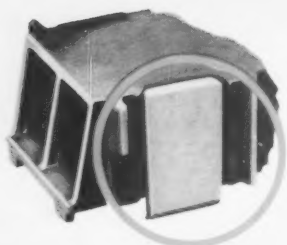
"GOOD SERVICE"

"PROPER FUNCTIONING AND LONGER WEAR LIFE"

"REGULAR FREIGHT SERVICE
OVER 6 YEARS"



INSPECTION REPORTS SHOW HAVE LONGER WEAR LIFE



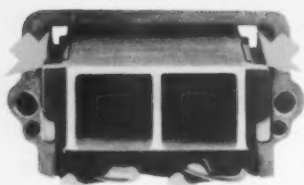
Specially hardened spring steel wear plate is welded to bolster. Large flat bearing area reduces wear.



Special hardness ratio between wear plate and bolster contact face of wedge gives maximum wear resistance to both wedge and plate.



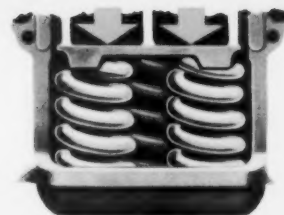
Large, even, full width bearing area in side frame wedge pocket, plus "rocking" motion of wedge, reduces wear on both faces.



Stability of bolster, resulting from friction control mechanism, is indicated by little contact between side frame column wear pad and bolster column lugs.



Low-stressed wedge springs are made of pretempered wire, cold-wound and shot-peened for long life.



Extremely light coil contact of load springs shows few oversolid blows, proves effectiveness of friction control mechanism.

THAT NATIONAL C-1 TRUCKS

the Key to

Successful

Railroading

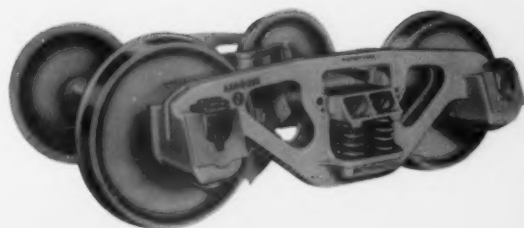
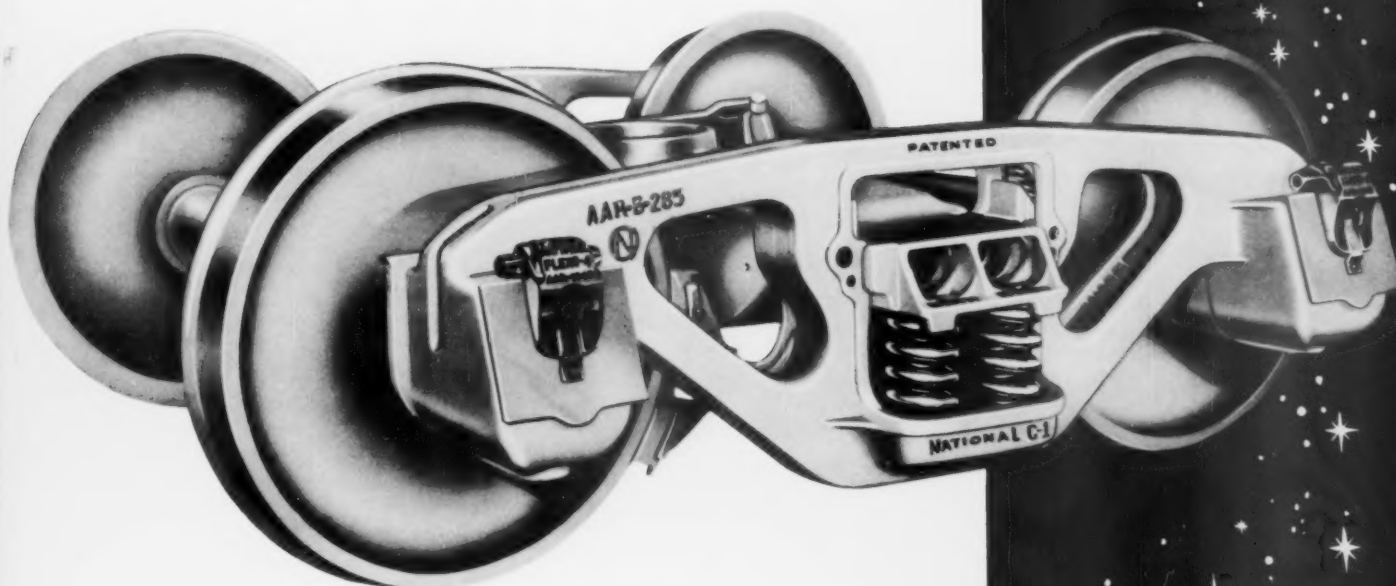
NATIONAL
SPECIALTIES

The heart of a smooth-riding freight car is the friction control mechanism of the truck.

Users have known for years that National C-1 Trucks provide this smooth, friction-controlled ride. And they also know that National C-1 Trucks have longer wear life.

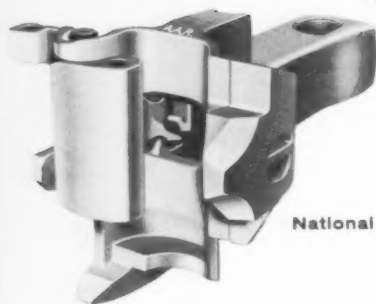
A recent control mechanism inspection, by a group of impartial railroad men, was performed on a group of C-1 trucks that had been in service for over 200,000 miles. This, and other inspections, indicate that *the friction control mechanism in National C-1 Trucks is designed for the life of the car.*

AA-7481

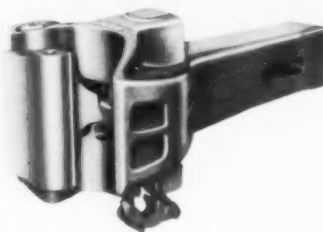


The Railroads are Moving Ahead...

with these NATIONAL SPECIALTIES



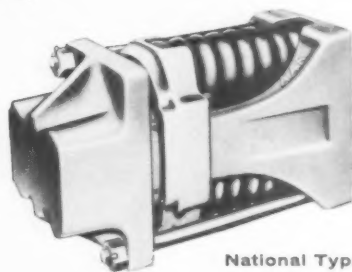
National Type F Couplers



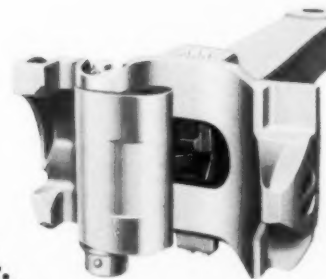
National Type E Couplers



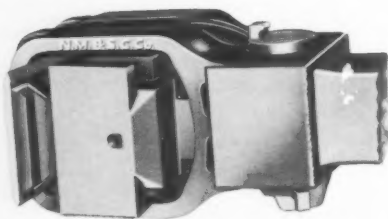
National C-1 Trucks



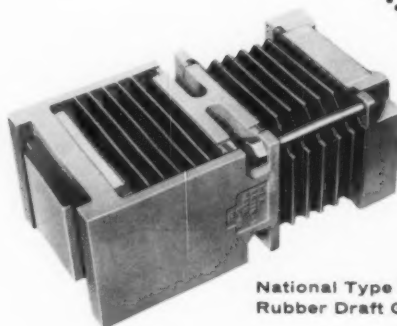
**National Type M-17-A Friction
Draft Gears**



**National Type H Tightlock
Couplers**



National Type M-380-A Diesel Rubber Draft Gears



**National Type MF-400
Rubber Draft Gears**

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At that moment, Big Jim, the boss, hustled up and asked where Pete was.

'The Engine Stopped'

By Ken Wright

TONY AND MIKE began eating their lunches together after they had made such a foolish mistake while trouble shooting a mechanical refrigerator car. A car—reported as a failure—had actually been out of fuel, and Tony and Mike had failed to notice this. Now they enjoyed these lunch-period sessions. It seemed their mutual mistake had developed a comradeship based on that event. Mike was saying, "I sure didn't think that Pete could make these mechanical refrigerator cars so damn easy to understand. He usually does nothing but complain. But, suddenly he's a pretty good instructor."

Mike was referring to the short class sessions that Pete was holding once a week at the beginning of the work day. Tony agreed. At that moment Big Jim, the boss, hustled up and asked where

Pete was. Mike told him that Pete had driven home during his lunch period. "Well, in that case," said Jim, "I guess you fellows will have to give the mechanical refrigerator cars another whirl. I hope you don't fall down again—and I don't think you will. One of the inspectors at the yard just called in to say that PREX 857 had its engine running when he first got to it, but that the engine stopped while he was there. Car's on Track 5 near the east end. You two go over. If you can't fix it right away, call me and I will have the car cut out of that train."

On their way to the car, Mike and Tony said nothing. Each was thinking about what would happen if they failed again. Finally Tony said: "Do you remember what Pete said that first day he held a class? 'Don't make a hard job out of a simple one.' Let's check the simple and easy things first."

Upon arrival at the car, the first thing they did was to check the fuel tank. It was two-thirds full. Next they checked to see what type of equipment was installed in the car. Painted up over the

machinery compartment was *Thermo-King*.

"Say, Mike," Tony exclaimed, "isn't that the type of equipment that Pete was telling about the other day?"

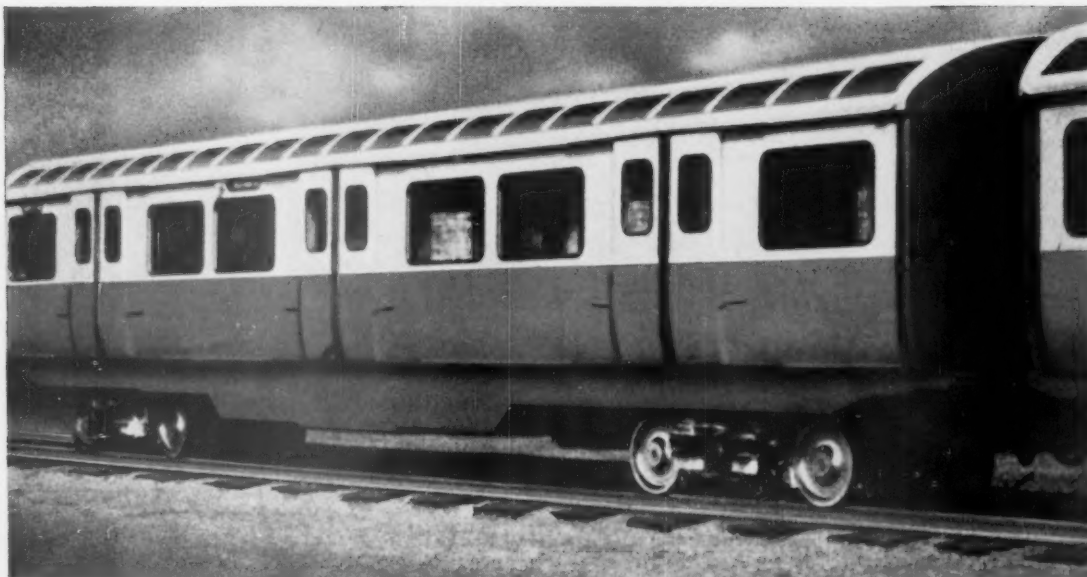
"You mean," replied Mike, "the one that operates on kerosene and is not a diesel but a spark ignition engine? It drives the compressor direct without any electric system."

Tony agreed and continued, "Some Thermo-Kings were developed for butane or gasoline. On all of them, thermostats stop and start the engines."

"Wait a minute, Tony," Mike cautioned, "Pete also said that Thermo-King has a later unit with a diesel engine that does not stop, but cycles down to a lower speed when the car temperature is lowered to the thermostat setting."

With that, Tony went back to the fuel tank. It was labeled *Kerosene*. They then opened the inspection door and there was the Thermo-King unit. The engine had a spark ignition system. The thermometer stood at 38 deg. A look at the log book showed that the car was
(Continued on page 58)

This is the fourth article in this series, discussing the operation, maintenance and trouble shooting of mechanical refrigerator cars.



Now in use on the Metropolitan Transit Authority—Boston

ASF Unit Brake.....

- A self-contained, compact, low-cost unit with manual or automatic adjustment.
- Available in models for transit or railroad passenger cars.
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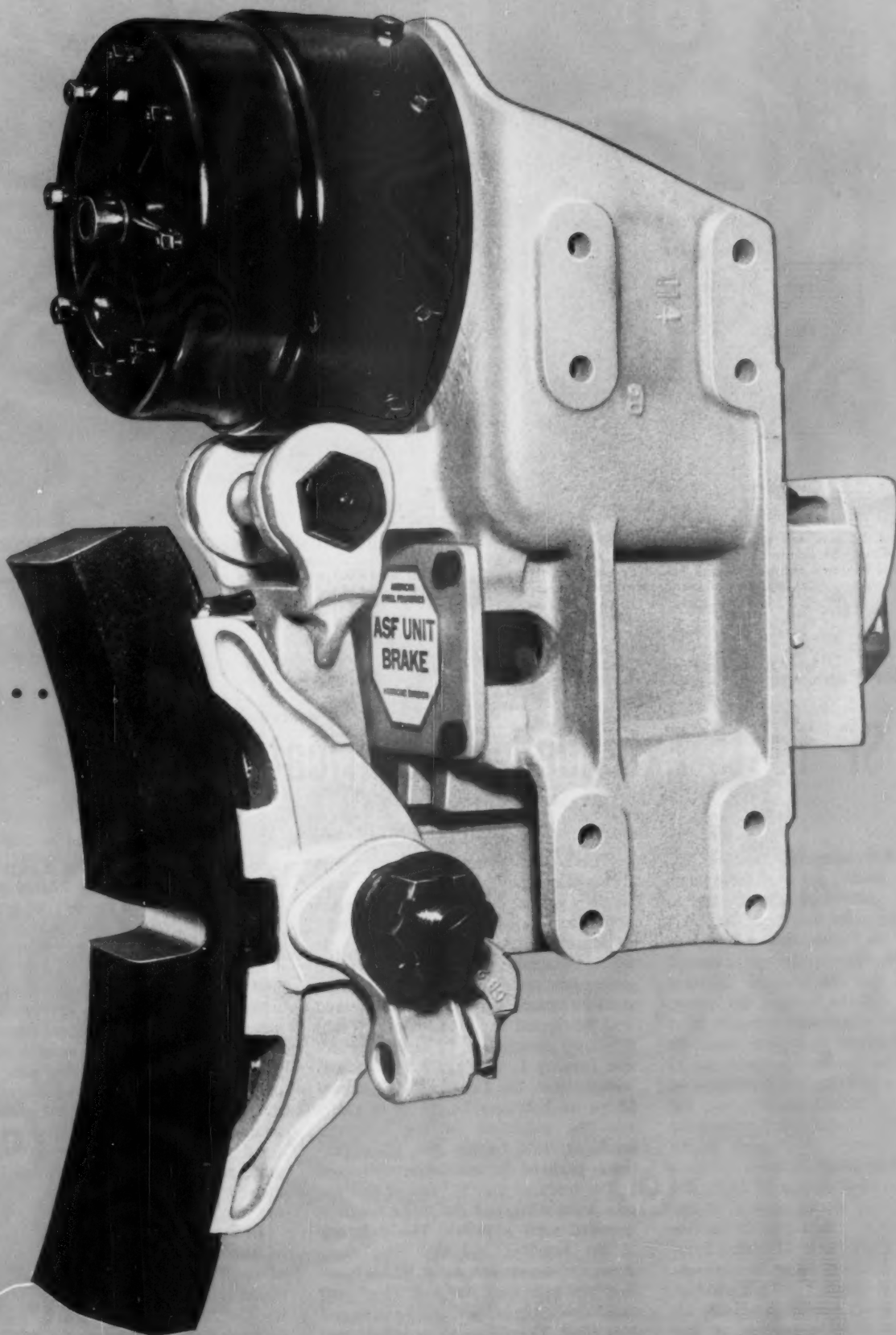
Synonymous with Brake Development
for over a half-century.

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Grease remains in cone and roller assembly of car SP-510005 after disassembly following 36 months of service. Two package bearings in this car which were inspected and weighed still held 6 oz and 4 oz of the original 15 oz of grease. After inspection, all bearings went back into service.



Back seal from SP-510117 shows wear which was reported by SP mechanical department as being "severe, non-through for 210 deg." Similar seal from car SP-510005 was found to be in "excellent" condition following the 36 months of high-mileage piggyback operation.

For Roller Bearings . . .

SP Tests Extended Re-Lubrication

SEVEN SOUTHERN PACIFIC TOFC cars have operated for over three years without the addition of any lubricant to their package roller bearings. The AAR Committee on Lubrication referred to this test in its report to the recent annual meeting of the Mechanical Division which said, "While leakage did occur, the bearings which were disassembled were in excellent condition after 36 months." The Committee went on to say that it is studying the possibility of extending the relubrication period for grease-lubricated roller bearings from the present mandatory 18 months to 36 months. (RL&C, July 1958, p. 30).

During the first quarter of 1955, the Southern Pacific equipped ten 70-ton flatcars in TOFC service with Timken 6 x 11 in. Heavy Duty AP roller bearings. These Timken roller bearing assemblies were applied to integral-box side frames which were altered only by cutting off the front portion of the journal box perpendicularly back of hinge lug.

These cars were lubricated with Texas Company's No. 979 "O" consistency grease, one of the present AAR approved lubricants.

Because AAR Interchange Rule 66-A, Paragraph (a), then required that grease-lubricated roller bearings on cars used in interchange service be checked and lubricated each 12 months (subsequently changed to 18 months, effective January 1, 1958), SP-510145 was brought into the Los Angeles General Shops on February 14, 1956 to ascertain the condition of the bearings, lubricant, side frames and other pertinent parts of the truck assembly.

The truck at the "B" end of this car was dismantled, and the roller bearings removed with a puller. The exteriors of the bearings and end caps were cleaned of accumulated dirt. These bearings and caps were weighed. They were then thoroughly purged of all grease and reweighed. The difference in weight was used to determine exactly how much grease had been consumed in the oper-

ation of these bearings for a period of one year—approximately 72,000 miles. The initial charge of grease (pre-greased at factory) consisted of 15 ounces. Consumption of grease was as follows: R-1 position—4 oz; L-1—5 oz; R-2—8 oz, and L-2—5 oz. The bearings, wedges, wheels and other truck appurtenances were found to be in excellent condition with no undue wear or defects noted.

As each of the remaining nine cars completed its first year of operation, the stenciling was changed by merely adding the figure "2" in front of the word "LUB" and substituting "56" in place of "55" in the date without disturbing the trucks or bearings, or without adding any lubricant.

In February, 1957, the SP arranged to dismantle the truck at the "A" end of car SP-510145 to observe the condition of the grease after two years service. Car SP-510145 was sent to the Los Angeles shops on February 14, 1957. By then, it had operated 147,000 miles without the addition of any grease to the

roller bearings on the "A" end truck since their original application on February 17, 1955. This truck was dismantled, and the roller bearings removed. The bearings and end caps were first cleaned of accumulated exterior dirt and then weighed. After being thoroughly purged of all grease, they were reweighed. The difference in weight was again used to determine exactly how much grease had been consumed. The grease consumption of the four bearings during the two-year period had been as follows: R-4 position—2 oz; R-3—none; L-3—5 oz, and L-4—3 oz. The bearings, wedges, wheels and other truck appurtenances were found to be in excellent condition with no undue wear or defects.

As each of the other nine cars completed its two years of operation, the stenciling was changed by adding the

figure "3" in front of the word "LUB" and substituting of "57" in place of "56." The trucks and bearings were not disturbed, and no lubricant was added.

Because the truck at the B end of car SP-510145 had been inspected at the end of one year's operation and the truck at the A end of this car inspected at completion of two year's operation, cars SP-510117 and SP-510005—both of which had been operated in similar service—were shipped in Los Angeles on February 25, 1958. The roller bearings were inspected after having completed 36 consecutive months of service without the addition of any grease and after operating approximately 216,000 miles in the three-year period.

Inspection was made in the presence of Mr. A. J. Schulte, lubrication supervisor, Atchison, Topeka & Santa Fe;

Mr. M. A. Pinney, engineer of tests, Pennsylvania, chairman and vice chairman, respectively, of the AAR Committee on Lubrication of Cars and Locomotives. Other members of the Lubrication Committee present at the inspection included Mr. Frank Fahland, general mechanical engineer, Union Pacific; Mr. Wayne Lasky, engineer of tests, Gulf, Mobile and Ohio, and Mr. L. N. Griffith, assistant mechanical engineer, Southern Pacific.

Grease removed from these bearings was found from laboratory analysis to be in good condition considering the extended service period and absence of any make-up grease. In view of this, the SP is going to run the remaining seven cars for another year, or to wheel change, (whichever comes first) without the addition of any grease to the journal bearings.



Marks on outer races indicated that the bearing package had "crept" under the adapter as it was designed to do. There was no significant wear.



Integral box side frames were altered to make the bearing application on these ten SP piggyback cars. Front of the box was burned off.

Inspection of 6 x 11-in, AP-type Roller Bearings on 70-ton Piggy Back Cars

Lubricated with "O" Consistency Grease
Los Angeles, Cal., February 25, 1958

Car Number	510117	510117	510005	510005
Months of Service	36	36	36	36
Approximate Mileage	216,000	216,000	216,000	216,000
Wheel Position	R-3	L-3	R-4	L-4
Housing Cleanliness	Moderately dirty and dry	Moderately dirty and wet	Moderately dirty and dry	Moderately dirty and dry
Original Lateral (in.)	0.006	0.005	0.003	0.003
Present Lateral (in.)	0.007	0.005	0.0075	0.003
Weights:				
Bearing and Grease (lb-oz)	48-12 1/2	48-12	48-11	48-9
Dry Bearing (lb-oz)	48-5	48-5	48-5	48-5
Remaining Grease (oz)	7 1/2	7	6	4
Grease Originally Applied (oz)	15	15	15	15
Grease Consumed in 36 mos (oz)	7 1/2	8	9	11
Grease Consumed (per cent)	50	53	60	73
Wear of Back Seals	Moderate non through for 90 deg	Severe, non through for 210 deg	Excellent	Severe, through for 180 deg
Wear of Front Seals	Very slight, non through	Excellent	Slight, non through for 45 deg	Severe, non through for 210 deg
Wear of Seal Wear Rings	Very slight	Very slight	Very slight	Very slight

Notes on the Test

Condition of Grease: In each case the grease was very dark and well worked with no visible change in consistency or contamination.

Lubrication: In each case the lubrication appeared excellent and well distributed through the bearing.

The seals were pressed out of the outer race of one AP bearing in order to make an examination of the bearings by the members of the AAR committee present. The condition of the bearings was found to be very satisfactory. On the following day in the presence of L. N. Griffith (representing the AAR Lubrication Committee), the seals were pressed out of five other AP bearings which had been inspected by the entire committee the previous day. The condition of these bearings was found to be very satisfactory and similar to the first one examined. The outside diameter surface of the outer races showed no wear; it did show that the outer races had crept through 360 deg as evidenced from contact marks with the adapters.

Four sets of wheels were dropped from these two cars for the bearing inspection. Three sets of wheels were replaced with new wheels at this time because remaining wheel life would have required replacement at an early date. Bearings on these three wheel sets have run from wheel application to wheel removal without lubricant addition or bearing replacement. The cars are equipped with multiple wear freedom passenger car wheels which had been turned down for freight service.



Tips to help you cut impact socket breakage



- Position power wrench so that socket fits straight on nut. Tilted wrench causes binding and socket breakage.
- Use right size socket... replace worn or undersize nuts. Loose-fitting sockets wear faster — then break.
- Don't keep impacting after nut is tightly set. This causes needless wear on both wrench and socket.
- Keep the inside of sockets clean. Dirt and grease are common causes of socket breakage.
- When power wrench drive head becomes worn — replace it. Loose drive causes excess wear in socket drive opening — early socket breakage.

Best tip yet!

ALWAYS USE *Snap-on* INDUSTRIAL SOCKETS

Sockets used on power nut runners and impact wrenches take a terrific pounding. Standard hand-wrench sockets are not designed for this work. *Snap-on* heavy-duty industrial sockets have the extra heft and toughness to take the beating. Result: more work-hours per socket and, equally important, less costly downtime resulting from fre-

quent breakage of ordinary sockets.

Final tip. Talk sockets with your *Snap-on* railroad specialist. Take advantage of his tool knowledge, and his competent advice on what is best for you in the wide range of *Snap-on* sockets for railroad use.

Write for complete information.



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CORPORATION

Railroad Division

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'The Engine Stopped'

(Continued from page 53)

loaded with fresh eggs, and the thermostat was set for 38 deg. All this meant that there was nothing wrong with the equipment.

The engine had stopped when the temperature of the car had gotten down to the thermostat setting. When the car's temperature did go up, the engine would be cranked automatically. When it started, the car would again begin cooling.

While the log book was out, Tony filled in their routine inspection. They had some difficulty in knowing just how to make the report when the engine was not running. They decided that the best they could do would be to check oil, water and general condition, then make a note that the engine had cycled off.

While Tony was closing the doors and resealing the compartment, Mike went to the phone and called Jim. When the two met, Mike was laughing. "Big Jim was fit to be tied when I told him there was nothing wrong. I told him that we would explain when we got back. I'm hoping that Pete will be around to back us up."

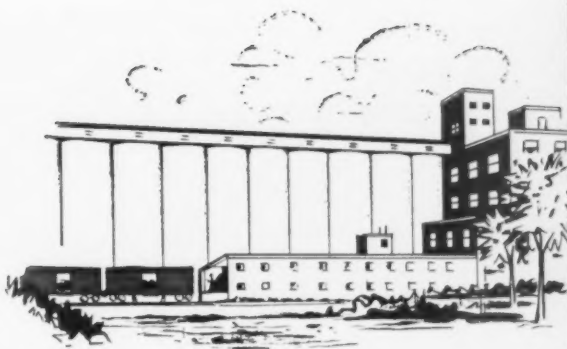
When they did get back to the shop, Jim met them with, "What do you mean there wasn't anything wrong? The engine wasn't running was it?"

They explained to him that this type of equipment was different than others—that the engine cycled on and off automatically. While they were explaining this, Pete walked up and listened. When they had finished, Pete verified all that they had said.

"Do you mean, then," Jim asked, "that listening for the engine to be running or stopped on any refrigerator car is no assurance that the equipment is operating or has failed."

"Of course not," Peter replied. "On these Thermo-Kings, the engine stops and starts. In fact, if the car is equipped with two units—which they are in some cases—one engine might be running and the other stopped. On other systems where a diesel engine generates electric power, the engine might be running, but still the rest of the equipment could have failed. There could be tripped circuit breakers, defective relays, defective wiring, or all sorts of other troubles."

The group broke up. "Over and over again," Pete mumbled to himself, I told them all about this at the session only the other day, and that had to be the day that Jim was away. Now I have to tell him the same story." Pete still was not happy; probably never would be.



Minneapolis & St. Louis Railway reports:

**8 to 10 Extra Flour Cars
every day with**

ADM

Freight Liner 810

● Sacked flour must be shipped in boxcars with clean, smooth linings . . . free from rough or broken areas, grease and oil stains. The flour millers in Minneapolis have trouble getting enough top grade cars; rejections run high.

The Minneapolis & St. Louis Railway Company, using the ADM Freight Liner System, has substantially increased the number of flour cars it supplies to Minneapolis mills. The M•St. L. is now providing eight to ten *extra* flour cars each day . . . eight to ten *extra revenue* cars. And it has not had a single Freight Liner-treated car rejected.

Like 30 other U.S. railroads that have upgraded more than 80,000 cars with Freight Liner in the last two years, the Minneapolis & St. Louis finds Freight Liner ideal when sealed, smooth interiors are a must.

The plastic-and-fiberglass treatment seals rough or broken walls and corners with a smooth, tough surface that is moisture-proof and easy to clean. And the plastic alone seals off oil and grease spots. The Pure Food and Drug Administration approves ADM Freight Liner 810 for shipment and storage of foodstuffs.

Let ADM technical service personnel show you how economical and easy-to-apply Freight Liner can solve your high-grade lading problems. For a demonstration on your cars, write, wire or phone ADM Freight Liner System, Archer-Daniels-Midland Company, 700 Investors Building, Minneapolis 2, Minn. (Federal 3-2112).



Here is evidence of the results you get with ADM Freight Liner 810 in boxcars. Top picture is before treatment.



Smooth, tight interior with full sanitary protection is shown in bottom picture. The finished job dried in minutes.

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Daniels-
Midland**

700 INVESTORS BUILDING,
MINNEAPOLIS 2, MINNESOTA

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ELECTRICAL SECTION

EMD Goes to All-Electric Control

GM diesels are now getting magnetically powered contactors which take the place of the traditional pneumatic switch gear

A MAJOR CHANGE in the control of diesel locomotives produced by the Electro-Motive Division of General Motors has resulted from work done over the past five years. The newest EMD units are being fitted with all-electric traction control systems. Until now,

traction control has been based on pneumatically operated contactors.

In 1952, the electrical engineering section of EMD was assigned to the redesign of the control equipment on GM locomotives to reduce maintenance costs and road failures. Undesirable fea-

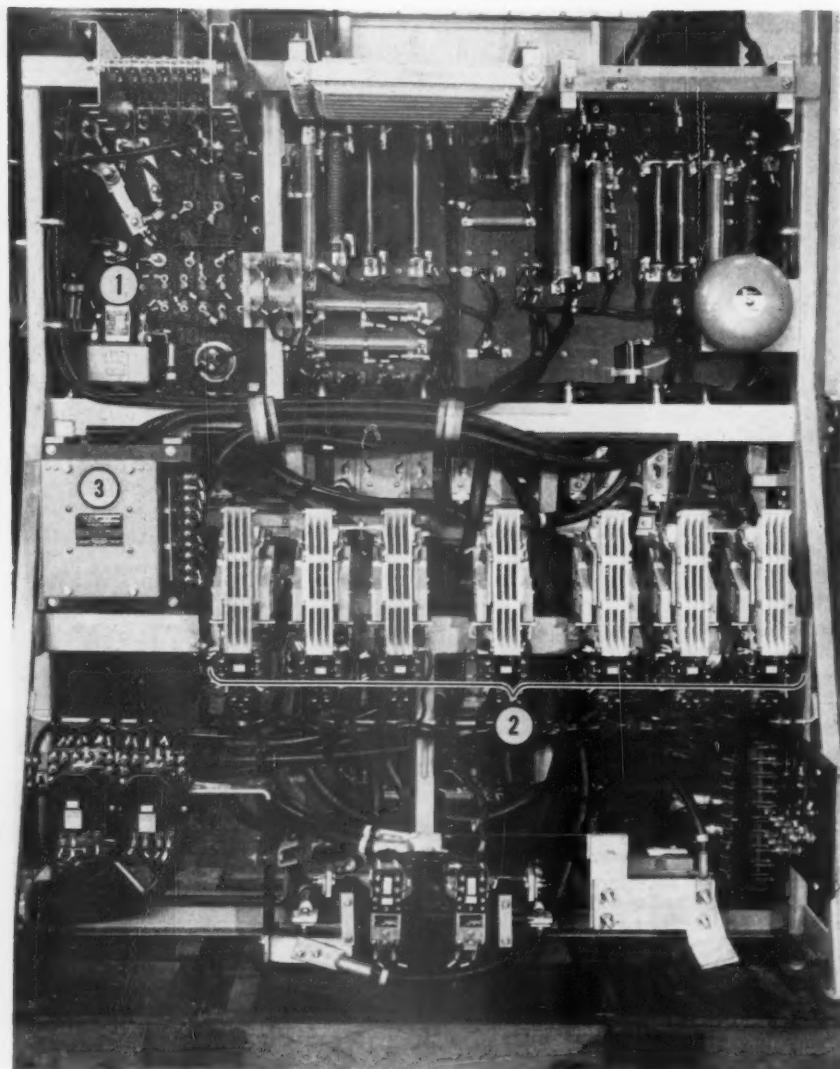
tures were to be eliminated. Maintenance and repair of electrical equipment were becoming major factors in locomotive maintenance costs. As one EMD spokesman put it, "We have had our share of troubles with diesel power from the beginning—big and little troubles. As the various sections worked out their problems with engines and related accessories, the major difficulties began to disappear. Minor troubles in the electrical system became major headaches. Something had to be done."

Too many failures and costly delays were caused by loose and lost bolts and nuts. Other road failures resulted from fraying of braided shunts—most always one wire at a time, and the wearing of copper contacts in non-enclosed interlocks caused by abrasive dirt and the sliding action. Many electrical equipment designs, taken from industry where equipment was stationary and load factors were different, proved inadequate when applied to diesel locomotives.

Vibration due to mobility and restricted space were major problems. From the time the first EMD diesel locomotive was turned out, there always have been requests from railroads for changes requiring additional control functions. One increment after another was added. For instance, the original wheel slip indicator and its modifications, and the evolution from manual to automatic motor transition. It became a question of making the control cabinets larger or the components smaller.

It was decided to design with a goal of six year maintenance cycles. The new components would have to be simplified, lighter in weight, easier to apply, protected from the elements, and capable of being replaced as a unit, if possible.

One of the first items was the interlock, an auxiliary low current contact used in control circuits to reflect the position of the main contacts of a power contactor. Here was a fertile field for improvement. About anything that could

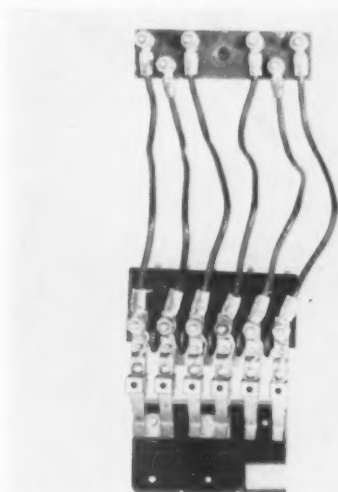


Engine side of new GP-9 control rack has (1) starting contactors, (2) power contactors, and (3) field shunting contactor assembly, all of the new design.

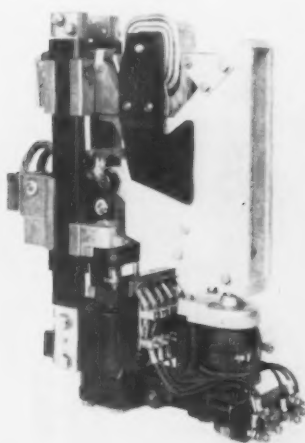
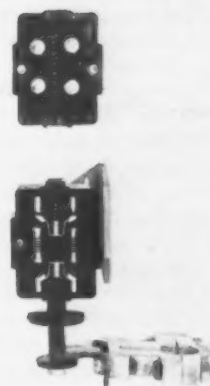
Basic Features Make New Equipment Possible . . .



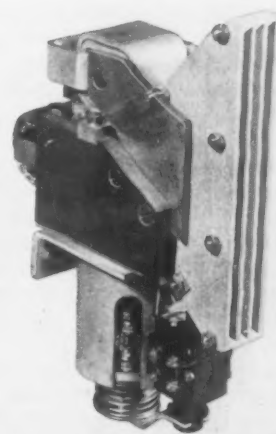
Coil and magnet frame assembly is key to entire development; equals air cylinder in performance.



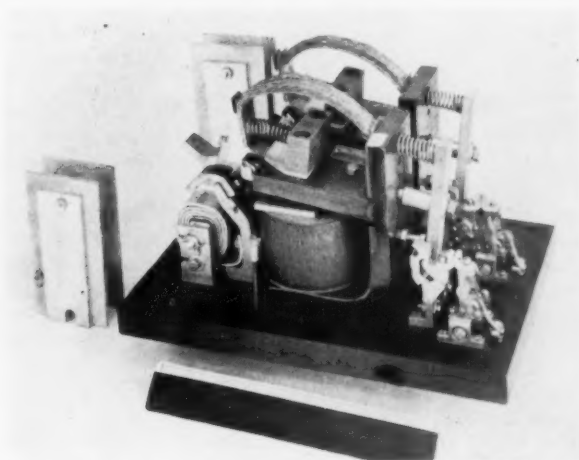
Interlocks as redesigned do not require flexible leads and are completely enclosed to exclude dirt from contact surfaces.



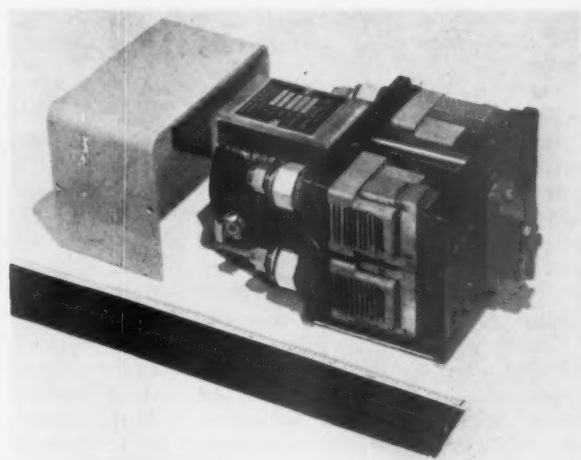
Familiar old-style power contactor has open interlocks back of magnet valve under arc chute.



New power contactor design has enclosed interlock assembly mounted at the front of the device.



Old style engine starting contactor has braided shunts and open interlocks. Solenoids and contacts are bulky. Such starting contactors have been the source of some road failures.



New style engine starting contactor is half the size of former standard and now has completely enclosed interlocks. Its operation is expected to be comparatively trouble-free.

happen to a piece of equipment happened here—dirt, loose connections, loose bolts, loose nuts, frayed shunts, and sliding contacts on copper surfaces. All were potential troublemakers. Specifications for the new interlock required that it (1) be totally enclosed, (2) be designed to eliminate sliding action, (3) eliminate copper as a contact or interrupting surface, and (4) have specific alloys for special purposes.

Requirements like these also entered into the redesign of the power contactors. For example, a silver cadmium alloy, about $\frac{1}{8}$ in. thick, is brazed on the copper contacts to handle 1,000 amp for the D-47 motor of a GP-9. Alloy contacts, although they erode and oxidize, still remain good conductors because line or point contact areas carry the load. A perfectly machined contactor is not feasible, because of its cost and because it does not come open readily.

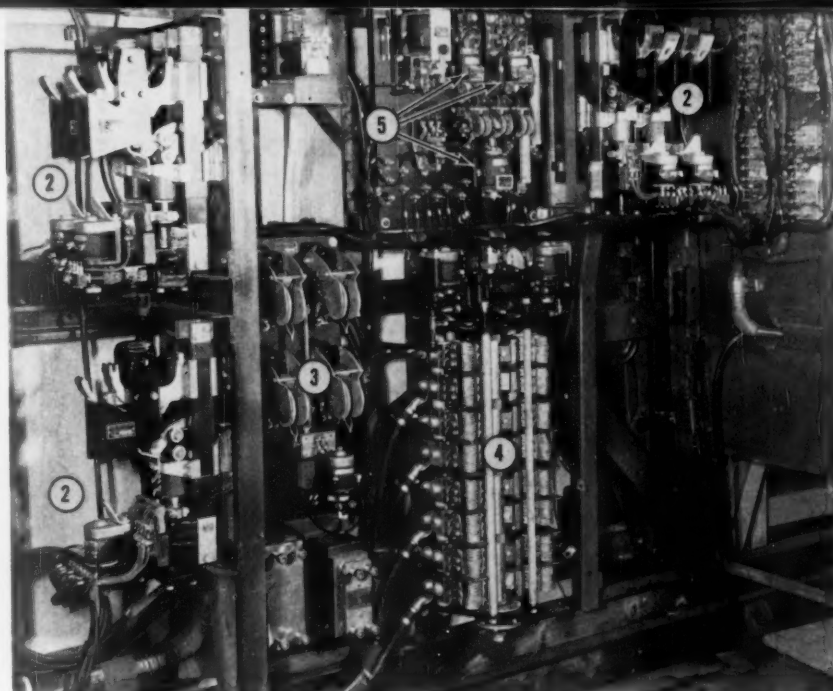
The engine starting contactor was bulky; and it had braided shunts, copper contacts and exposed interlocks subject to dirt. The new model is half the size and the interlocks are totally enclosed. Contacts are now made of a silver alloy.

One basic design of contactor takes the place of the separate types formerly used for the battery field, shunt field, and battery charging contactors. The battery field contactor makes and breaks the circuit (60 amp maximum) to the generator battery field; and the battery charging contactor makes and breaks the circuit (225 amp maximum) from the auxiliary generator to the battery. The shunt field contactor makes and breaks the generator shunt field circuit.

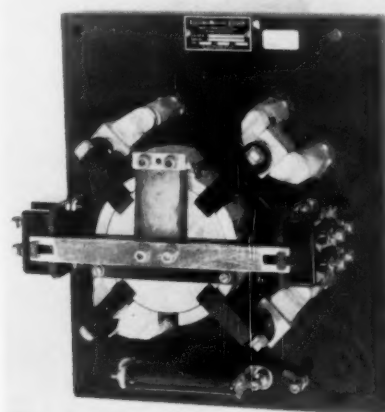
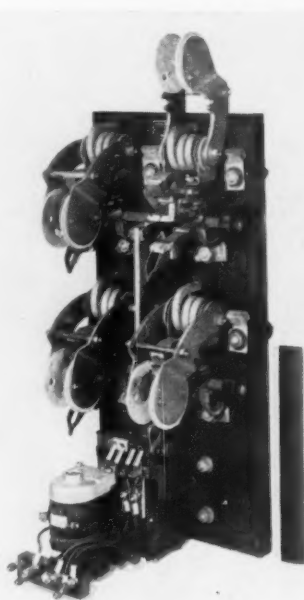
Application of an additional bus bar and a special arc chute places the contacts in parallel on the battery field contactor. The contacts are in series on the shunt field contactor. The size of these alloy contacts varies with the current to be carried. All interlocks are enclosed.

The four-pole, motor field shunt contactor gave a lot of trouble. Its function is to shunt part of the motor field current through resistance to increase locomotive speed. The copper contacts used had to be changed constantly by railroads. Oxidation of the copper would cause high resistance through the contact. The sliding finger interlocks were exposed and the air cylinder was subject to leaks.

Malfunctions occurred in cold weather, particularly because the packing seal around the piston rod needed frequent lubrication. Under extremely cold conditions, the lubricant could congeal so the piston would not move. It was rather common to place lighted fuses



Control cabinet for FT locomotive, original GM road freight unit, has (2) power contactors, (3) field shunting contactors, (4) reverser, and (5) shunt-field, battery-field, and battery-charging contactors. Cam switch is in separate cabinet.



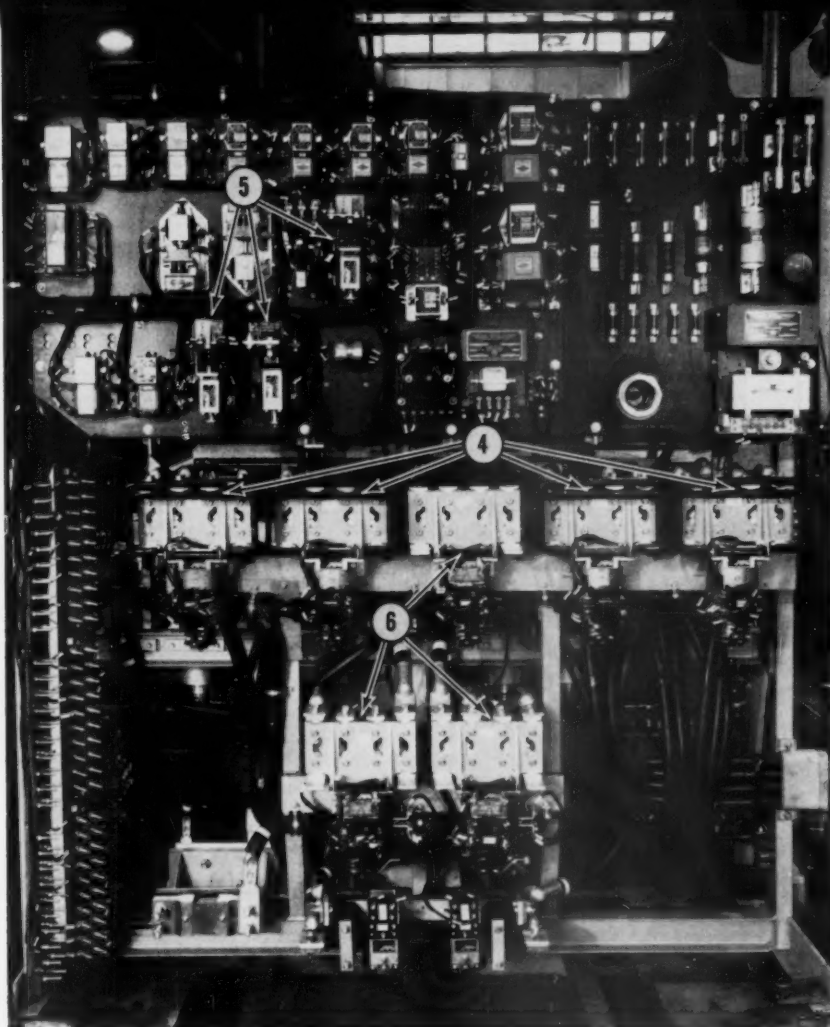
Redesign and simplification resulted in 4-pole motor field shunting contactor (above) which replaces the much larger unit (at left) used when EMD switch gear was air powered.

in the control cabinets to keep them warm. Flexing during the opening and closing of the contactor broke the braided shunts.

The redesigned contactor is more compact and the interlocks are enclosed. Bridge type, silver-alloy contacts are provided. The blowout magnets are doughnut-shaped and located under the retaining ring around the stationary contacts. Braided shunts were eliminated. Elimination of the air actuation of this device marked the beginning of a transition leading finally to the 100 per cent electrically controlled locomotive. Pneumatic operation was eliminated from the power contactors; from

the eight-pole, double-throw, brake transfer switch; and from the drum reverser. The major troubles experienced with pneumatic equipment have been (1) air leaks requiring constant inspection and replacement of seals, (2) freezing in cold weather particularly on the northern railroads, and (3) sliding contacts on the drum reverser which require frequent lubrication, often after each trip.

Changes made have eliminated all of these troubles and resulted in flexibility of application, ease of replacement and reduction in the space required. The current consumption for the power circuits is the same. Control circuits re-



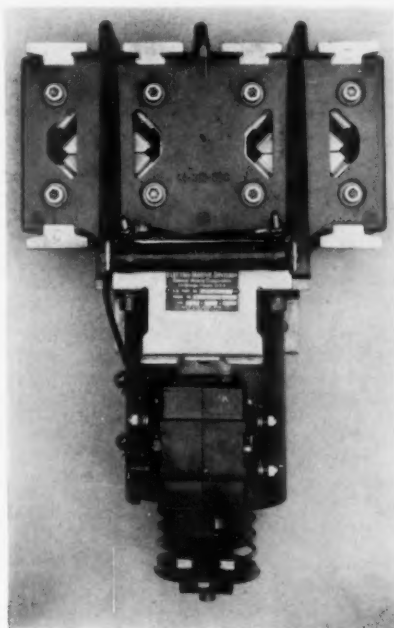
Cab side of new GP-9 all-electric control panel has (4) reverser contactors, (5) shunt-field, battery-field and battery-charging contactors, and (6) camswitch contactors.

quire about $\frac{1}{3}$ kw more. In speed of operation, the electric power contactor is no faster on pick up, but much faster—around 0.03 sec—on drop out. The magnet operation makes a cleaner break. The reversing and braking contactors are faster both ways. With all electrical controls, the cabinet can be sealed to keep unauthorized personnel out.

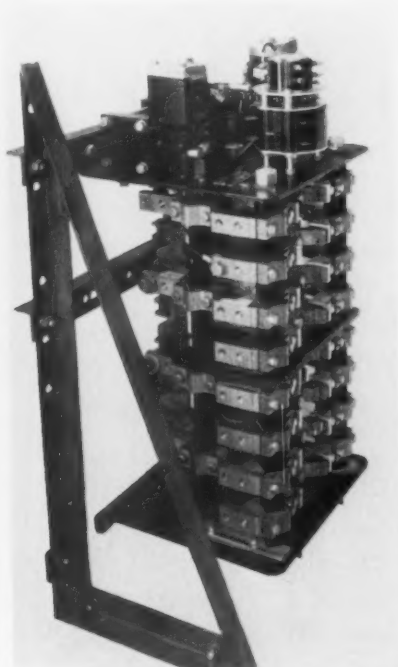
Power Contactors

The power contactor functions to make and break current to the traction motors and to connect them for either series or parallel operation. Prior to July 1957, in addition to the usual air troubles, the pneumatic power contactors were heavy and difficult to apply. Now magnetically operated, these contactors have the basic magnetic frame used on all the new switch gear. The interlocks are enclosed. Alloy contacts are standard and the braided shunts are gone.

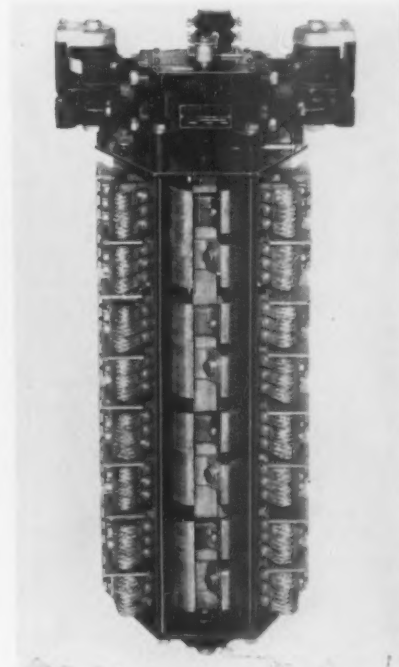
The eight-pole, double-throw, pneumatically operated brake transfer switch had all the shortcomings of any air-operated device. It functions to change the traction motors from motors to generators in dynamic braking. It was cumbersome, and a two-man job to remove or replace. The new unit is a two-pole, double-throw, magnetically operated device with the basic coil and magnet frame assembly. Three of these take the



New style, two-pole, magnetically-operated cam switch replaces both cam switch and reverser with separate, smaller units which are much easier to replace and maintain.



Pneumatically-operated cam switch is 8-pole assembly.



Air-powered reverser is heavy and difficult to handle.

place of the eight-pole device. They are small, compact, and can be replaced as units. The interlocks are enclosed, and braided shunts are eliminated. The alloy bridge contacts are double break, and no lubrication is required.

The pneumatically operated, drum reverser reverses four traction motors at one time by changing the direction of the current flow through their fields. It had

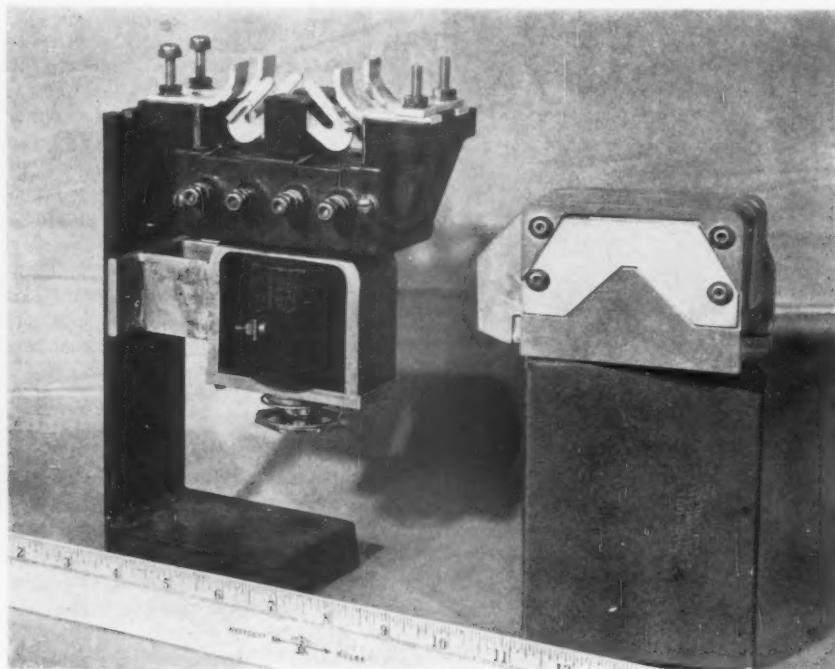
magnet valves, a cylinder and piston assembly, and braided shunts. The brass contacts were subject to a high pressure sliding movement which required periodic lubrication depending on the climate and environment. Replacement consists of four, two-pole devices completely eliminating undesirable features.

The first 100 per cent, electrically controlled locomotive was put into serv-

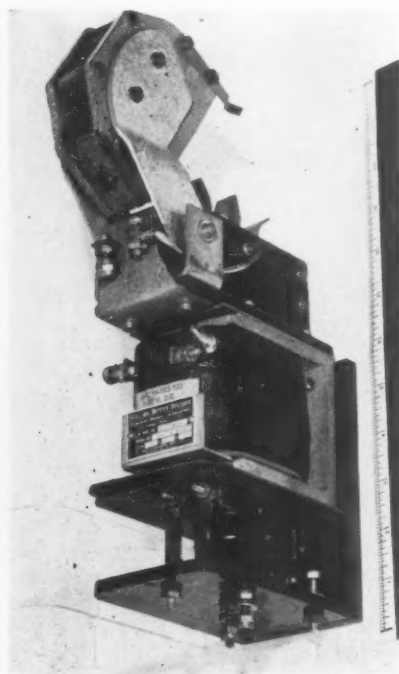
ice for test purposes on the Great Northern in July 1957. Four more went to work on the Union Pacific in September 1957. In January 1958, these new contactors went into production GP-9 locomotives. The Northern Pacific and Milwaukee received the first such locomotives with this equipment.

The contactors are being made by outside manufacturers, but all of them were designed by Electro-Motive. Air-operated equipment on present diesels can be converted to all-electric control. Generally, a new cabling job is required. One mid-western railroad is having some FT's converted to GP-9M's. On these, control cabinet is replaced as a unit.

The change from pneumatic control was made possible by dependable interlocking and a very efficient coil and magnet frame assembly. This assembly consists of totally enclosed magnets in a cylindrical iron shell fitted with close-tolerance, fiber-doughnut guides for the actuating plunger. The design minimizes stray flux, and gives a more positive concentration of flux through the air gap. The coil and magnet frame assembly requires little power. This power comes from the diesel unit on which the contactors are installed. An overburden is not placed on the lead unit controller, because when locomotives are used in multiple, this system does not power all contactors from the lead unit. Pilot relays on each unit take a signal from the control train line and contactors are then operated from the batteries or auxiliary generator on that unit.



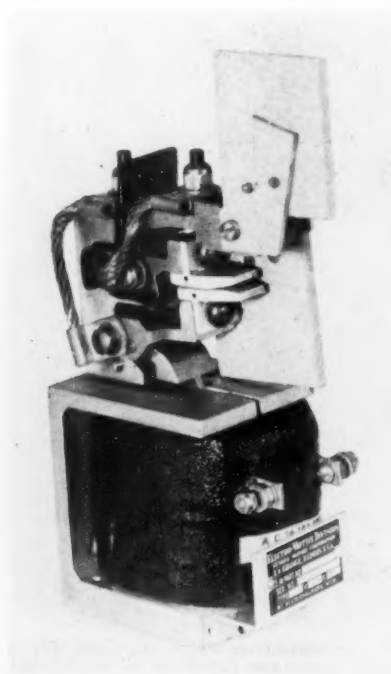
Three contactors of this new magnetically-operated type replace separate models of shunt-field, battery-field and battery-charging contactors used on older EMD units.



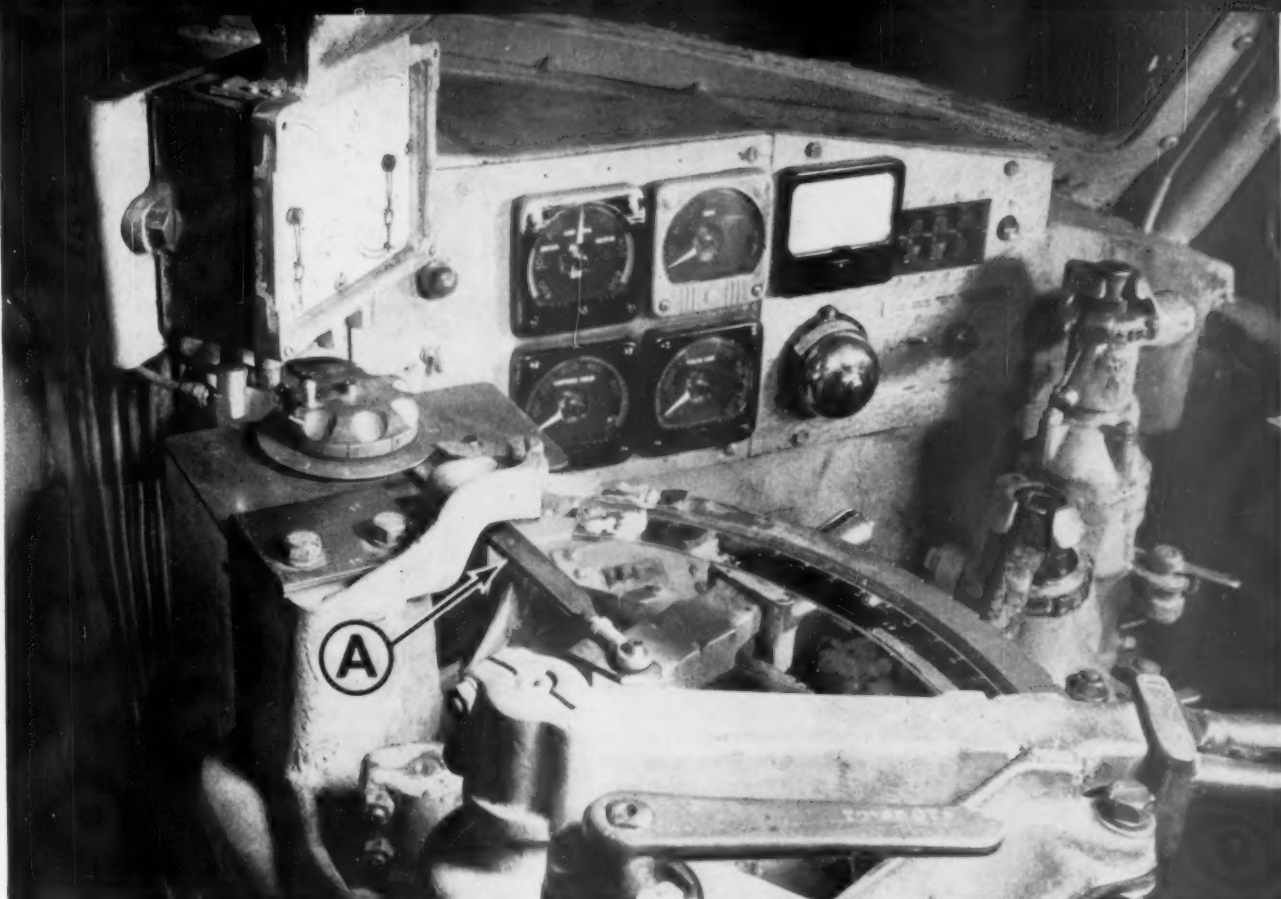
Old style shunt-field contactor.



Old style battery-field contactor.



Old Style battery-charging contactor.



The electric locomotive controller is shown in the foreground. The miniature diesel controller shown behind is operated by the rack bar A from the electric controller handle. This bar carries a rack which meshes with a gear on the diesel controller. The meter on the cowl at the right shows diesel traction motor amperes. The four switches at the right of the meter are control and fuel pump, engine run and controller, generator field and headlight. The button at the far right is engine stop. Below is the alarm bell, the sander control and the wheel slip light.

Diesel Boosters for Electric Locomotives

A miniature diesel controller coupled to the main electric controller enables the railroad to use its locomotives to full advantage

AN ARRANGEMENT has been worked out on the Chicago, Milwaukee, St. Paul & Pacific, whereby diesels may be used to supplement the power of electric locomotives. The reason for this development is that, for certain operating conditions, a second electric (which, at times, is not available) would provide more tractive force than is needed, while the smaller diesel is adequate.

Two EF4 electric locomotives can handle 5,800 tons from Avery, Idaho eastbound to Deer Lodge, Mont., (212 miles), but cannot handle such tonnage up the 0.4 per cent grade between Lombard, Mont. and Loweth, Mont., (49 miles). By using the diesel booster, the 5,800-ton train is moved through Deer Lodge, Mont. without switching out a reduction, thereby saving about 1

hr and 30 min. The running time from Deer Lodge, Mont. to Harlowton, Mont. (228 miles) is also decreased by about 30 min. This operation applies only to time freight trains.

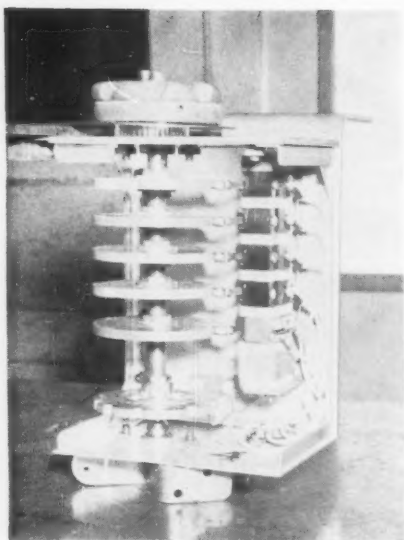
The westward time freight is very fast. With two EF4 electric units and the diesel booster, a 3,600-ton train can be handled over the entire division at passenger train speeds without stopping to cut in a helper. The speed with 5,800 tons on 1.0 per cent grade, or with 3,600 tons on 2.0 per cent grade is 25 mph.

The performance is made possible by a second miniature controller for the diesel which is coupled mechanically to the controller of the electric locomotive. Micro switches located inside the main electric locomotive controller and operated by movement of the electric locomotive reverser control circuit contactors, energize the diesel reverser control circuits, causing the diesel to reverse with the movement of reverser handle on the electric locomotive.

The miniature diesel-electric controller, referred to as the throttle controller, is mounted on the forward side of the main controller in the EF4 electric locomotive and coupled by mechanical means to the main operative lever of the EF4 locomotive controller. The throttle controller is provided with an operating handle and a locking pin by means of which the controller mechanism may be unlocked from the mechanical operating mechanism to permit manual operation of the throttle controller in case of necessity or in emergency.

Switches for controlling forward or reverse movement of the diesel unit are operated by movement of the reverser handle on the EF4 controller. These switches are mounted inside of the main controller case in the EF4 locomotive.

A small diesel unit control panel is mounted on the cowl in front of the engineman in the EF4 locomotive. On this panel are an ammeter showing diesel traction motor amperes, an alarm bell and a wheel slip light. Control



The diesel unit auxiliary controller with cover removed. At top may be seen pinion which meshes with rack bar from the electric controller.

equipment on the panel includes a control and fuel pump switch, engine run and controller switch, generator field

switch, headlight switch, sanders and an engine stop button.

Necessary control wires are run through the EF4 units, connecting the diesel control circuits to the throttle controller and panel on the electric locomotive. Control wire connections between the EF4 units, and between the EF4 unit and the diesel unit, are made with standard 27-wire diesel control couplers and sockets.

In operation, the diesel locomotive is coupled to the rear end of the electric locomotive. The brake pipe and signal line hoses are coupled, and hose cocks opened. The equalizing pipe hose on the diesel is coupled to the independent application pipe hose on the electric and hose cocks are opened. The brake equipment on the diesel is conditioned for trailing movement.

Control jumpers are installed between the diesel and electric locomotive, and also between electric locomotives, if two electric locomotives are used. On the diesel control panel, on the cowl in front of the engineman, the fuel-pump and engine-run switches are closed. The lock-

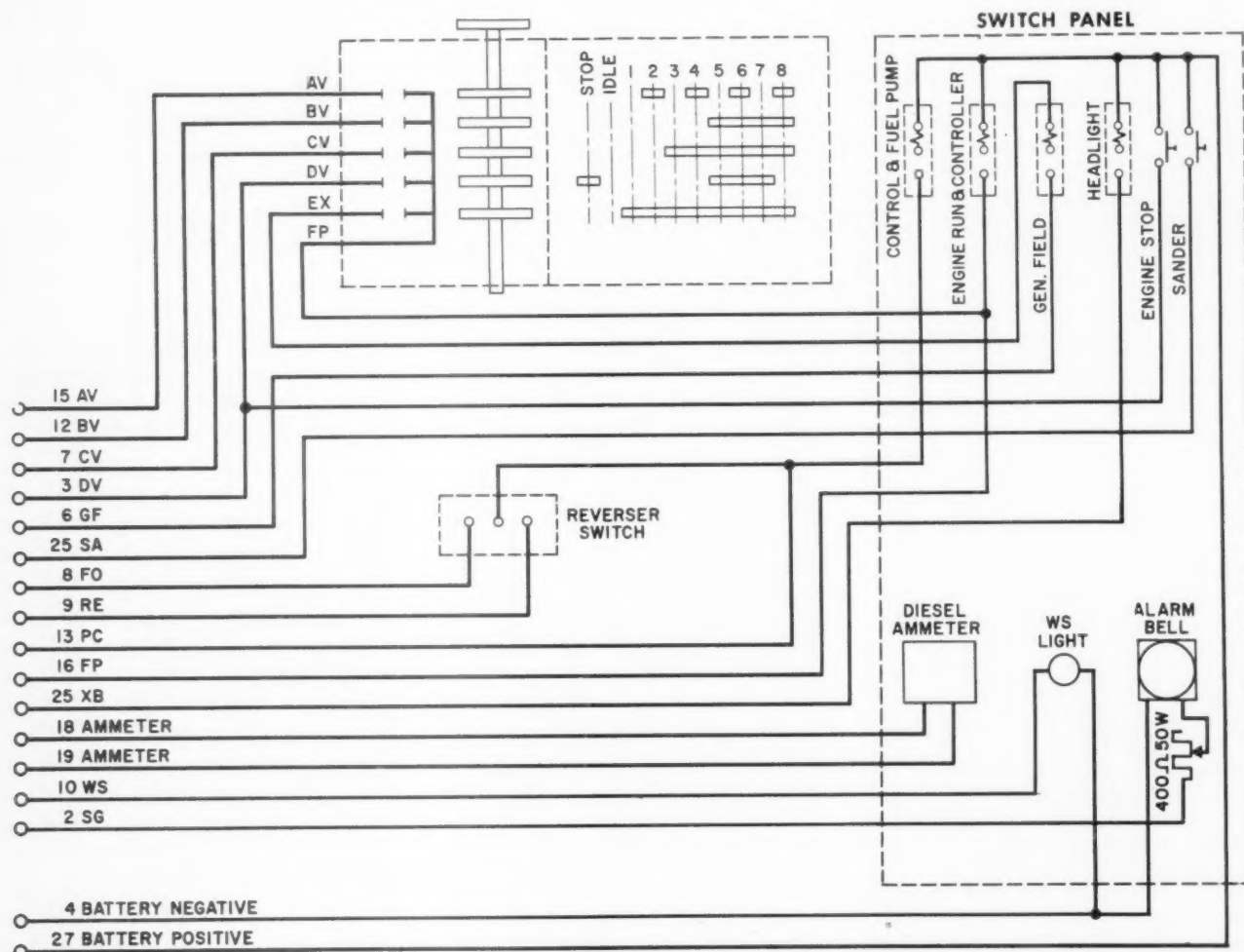
ing pin on the miniature controller connection must be down to mechanically connect the two controllers.

In the diesel locomotive operating cab, on the engineer's panel, all switches are opened with the exception of the automatic sander. In the diesel control cabinet, all switches must be in the *ON* position, and the isolation switch in *RUN*.

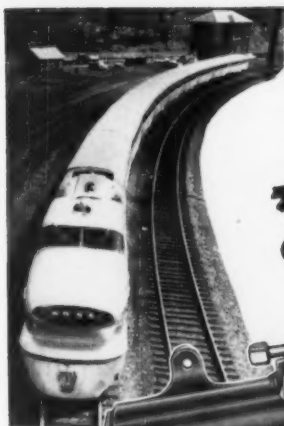
The headlight controller switch must be placed in 9 o'clock position, marked "Controlled from another unit coupled at either end." Control of the diesel locomotive is thus transferred to the operating cab of the electric locomotive.

To cut in the diesel locomotive, the engine run and generator field switches, located on the diesel control panel on the cowl in front of the engineer in the electric locomotive operating cab are closed. The diesel locomotive will then follow the operation of the electric locomotive controller and provide tractive force according to the position of the controller.

To cut out the diesel locomotive, it
(Continued on page 70)



Schematic wiring diagram for the miniature diesel controller and associated control circuits.



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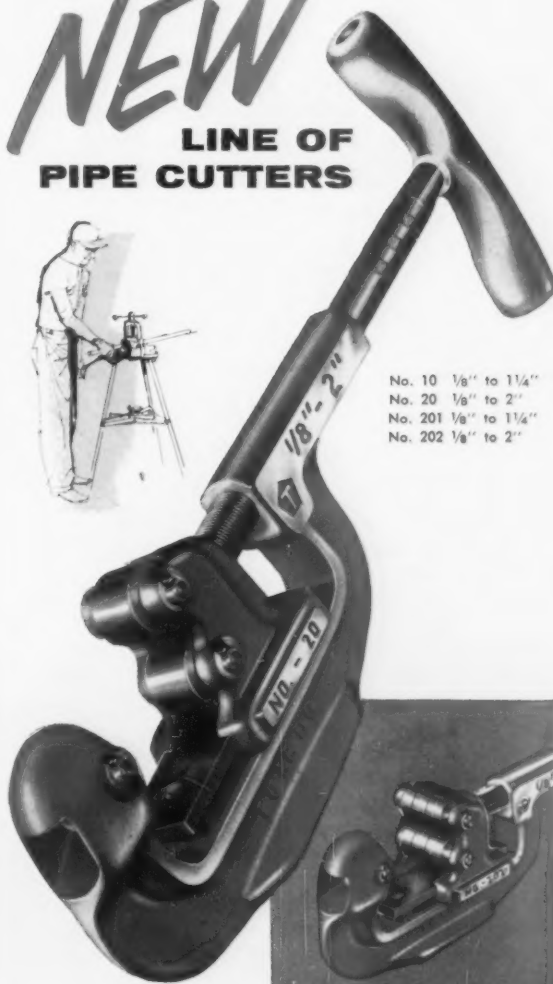
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If You Were a Traction Motor . . . Which Would You Prefer?

By Gordon Taylor

THE QUESTION of d-c or a-c hi-potting arose during a discussion among several maintainers. There had been a number of locomotive failures all involving electrical breakdown of traction motors or main generators. It was a matter of much concern to all of them. They decided to ask Doc Watts, the wise old electrical foreman at the system repair shop, to discuss the subject at the next meeting of their local diesel club.

Doc agreed and at the next meeting was on hand. "Most electrical failures," Doc began, "can be prevented by proper tests and maintenance precautions. We would be in a very hopeless business, if everything had to be left to chance. Fortunately, this need not be the case. A good doctor can make tests to determine the condition of his patient and then take corrective measures instead of waiting for a fatality and subsequent post mortem.

"The same opportunity is available for the electrical maintainer to learn if a locomotive is in condition to properly perform its work. These tests need not be made daily. They can be made at regular intervals, if the equipment is maintained in a reasonably clean, dry condition.

"It has been said that 'a man is as old as his arteries and a motor is as old as its insulation'. There is much truth in that statement. No doctor would approve of his patient entering a contest requiring much physical effort, if the patient had a bad heart or very high blood pressure. No careful maintainer should expect a diesel-electric locomotive with weak or defective motor insulation, to continue in heavy train service for long.

"The preservation of high electrical insulation value is one of the most important features of successful diesel-electric locomotive operation. It is so important that the ICC Bureau of Locomotive Inspection requires special insulation dielectric tests at least once a year.

"What is the dielectric value of in-

sulation? Dielectric insulation strength is the quality that allows it to resist passage or leakage of electricity through it. It is vital that proper dielectric strength be maintained at all times. The principal enemies of insulation are dirt, grease and moisture. Because they are all present on locomotives, we must wage a constant battle to keep insulation clean and dry.

"Insulation must be good to meet not only the needs of every day service, but it must be first class to withstand the strain of high-potential dielectric tests. These tests have generally been applied by connecting a high voltage transformer between the circuit to be tested, and ground. The ICC test requires that the test voltage applied to circuits other than motor or generator windings shall be not less than 75 per cent above normal working voltage. The test applied to windings shall not be less than 50 per cent above the normal working voltage. The test is applied for not less than one minute, and shall be applied to all circuits and parts carrying current with potential of more than 150 volts.

"For a power circuit operating normally at 600 volts", Doc explained, "it would be necessary to apply 1,050 volts when making the dielectric test. If the circuit or motor insulation is in a weakened condition, the application of high

potential test could be enough to destroy the insulation under test.

"When the ICC first required dielectric tests," he recalled, "our railroad was operating gas-electric cars. When we started making high potential tests, three traction motors were disabled the first week. Those high-voltage tests had completed damaging the insulation to the point where the motors had to be removed for rewinding.

"We figured there must be a better way. No more high-voltage tests were made until the equipment was first checked with a 500-volt direct-current hand-operated Megger-type generator. With this, we could determine the insulation value before applying the high potential test. We quickly found that many motors had weak insulation because of dirt or moisture. They, like a man with high blood pressure, should not be called on to withstand the strain of extra effort. We found that such motors, in many cases, could be cleaned and dried to restore the insulation value so they could successfully withstand the ICC high-voltage test.

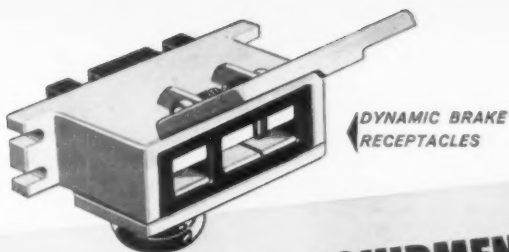
"Maintenance would be fairly simple if we had only to worry about the leakage of current through insulation. What makes it tough, is that we must also be concerned about the passage or creepage

(Continued on page 70)



This series of articles is based on actual experiences of men who operate and maintain diesel-electric locomotives.

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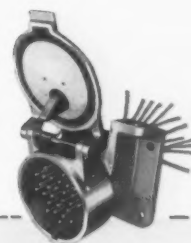
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Which Would You Prefer?

(Continued from page 68)

of current across the insulation surface. Such current paths are known as creepage paths, and are caused by the presence of dirt and moisture. Low resistance to current passage along an insulation surface is known as its creepage value.

"A preliminary Megger test, followed by cleaning or drying, and then the a-c high voltage test, constitute the procedure standard on most railroads. However, the men who are always looking for a better way, are considering the use of a direct-current testing procedure. The ICC does not specify that the high-potential test must be made with alternating current. It simply specifies the voltage to be applied. This gives us a choice of alternating or direct current for the high voltage test. We have used a transformer because it is generally more available than a high-voltage direct-current supply.

"Direct-current testing equipment is coming into use on railroads. It has much to recommend it. We have learned that high test voltages can destroy insulation, and that there is no need to apply more voltage than necessary to meet test requirements.

"Now comes the \$64 question. Suppose you were going to get a shock from a 110-volt circuit. Would you prefer contact with direct current or with 60-cycle alternating current?"

At this point a young apprentice spoke up. "It seems to me that a volt is a volt wherever you meet. If the voltmeter registered 110 volts in both cases, why wouldn't the effects be the same?"

"Good question," said Doc Watts. "We will clear it up right now. In the case of d-c, the voltmeter registers the maximum voltage. In alternating cur-

rent, we have a different situation. An alternating current or voltage continually changes in value and direction. The manner of change is represented by a wave form diagram. In an alternating current, the voltage starts at zero, rises to a peak or maximum voltage, drops to zero, then rises to a maximum in the opposite direction, then drops to zero once more to complete one cycle. You can see that twice on each cycle, the voltage reaches a maximum value. But the maximum voltage is not what the a-c voltmeter registers. It registers the effective voltage value, which is 70.7 per cent of the maximum value. Another way to express this idea is to say the maximum effective voltage, reached twice each cycle, is 1.41 times the effective voltage, or 1.41 times the voltage shown by the voltmeter. Thus in 110-volt alternating current, the maximum voltage would be 1.41 times 110 volts or 155 volts. A person getting across a 110-volt a-c circuit, receives 155 volts, 120 times during each second he remains in contact with the circuit.

"You can now understand why the application of alternating voltage to make the high potential test on a motor really applies considerably more voltage than indicated by the voltmeter. Suppose we prepare to apply 1,050 volts from the testing transformer, to a diesel power circuit or generator. The maximum voltage across the test circuit is really 1.41 times the voltage shown by the voltmeter, or 1.41 times 1,050 volts which is a total of 1,480 volts. This means we applied 430 volts more than was needed to satisfy the I.C.C. test requirement.

"There is much more to be said in favor of d-c testing, than the prevention of excessive voltage strain on the insulation of the locomotive.

"The principal advantage of the new

direct-current test sets is that they enable the maintainers to more exactly determine the condition of the insulation of the locomotive under test. It has been found that when the d-c test voltage is increased in steps, that ionization occurs at a voltage below that which might cause breakdown of insulation. The condition of ionization can be detected as a visible oscillation on the oscilloscope which is part of the d-c tester. The pattern of oscillations indicate the character of insulation conditions, such as "dry and clean", "dry and bad", "wet", or "very wet insulation. When the d-c tests more exactly pinpoint the condition of insulation, the maintenance force can more intelligently prepare the equipment for final high potential test.

"The d-c high potential tests are non-destructive if they are stopped when an appreciable amount of ionization is observed. This is because breakdown is always preceded by ionization discharges in the insulation system.

"The a-c high potential test equipment in common use does not give warning that a further increase in test voltage will bring destruction of insulation. Because it cannot so definitely indicate the condition of insulation, the a-c method permits you to blunder into a test that may destroy the insulation, and cause the need of rewinding a motor or generator.

"There are two things to be learned from this discussion—First—The d-c method of testing and applying the high potential test, or "hi-potting", offers a definite improvement over the a-c method. Second—Dirt in its various forms is Diesel Enemy Number One. As with other public enemies, there is a reward for its capture or banishment. Banish dirt from the diesel, and your reward will be better diesel performance, and reduced repair cost."

Diesel Boosters . . .

(Continued from page 66)

is necessary to open the engine run and generator field switches, located in the diesel control panel in the cowl in front of the engineman in the electric locomotive operating cab.

For normal motoring operation, it is necessary to throw the reverser on the EF4 controller for the desired direction of movement and then advance the controller handle in the usual manner, allowing sufficient time for slack action in the train and for throttle governor control in the diesel unit. The diesel throttle controller will follow the move-

ment of the EF4 controller, so that the diesel locomotive will be in No. 8 throttle, or full run position, when the EF4 controller is partially out. During further advance of the EF4 controller, the diesel locomotive continues in No. 8 throttle position. Any running position on the EF4 controller is a running position on the diesel locomotive.

If the diesel locomotive begins slipping for any reason, it will automatically sand and ultimately unload itself. Before this condition develops, action should be taken to correct it by partially unloading the diesel locomotive.

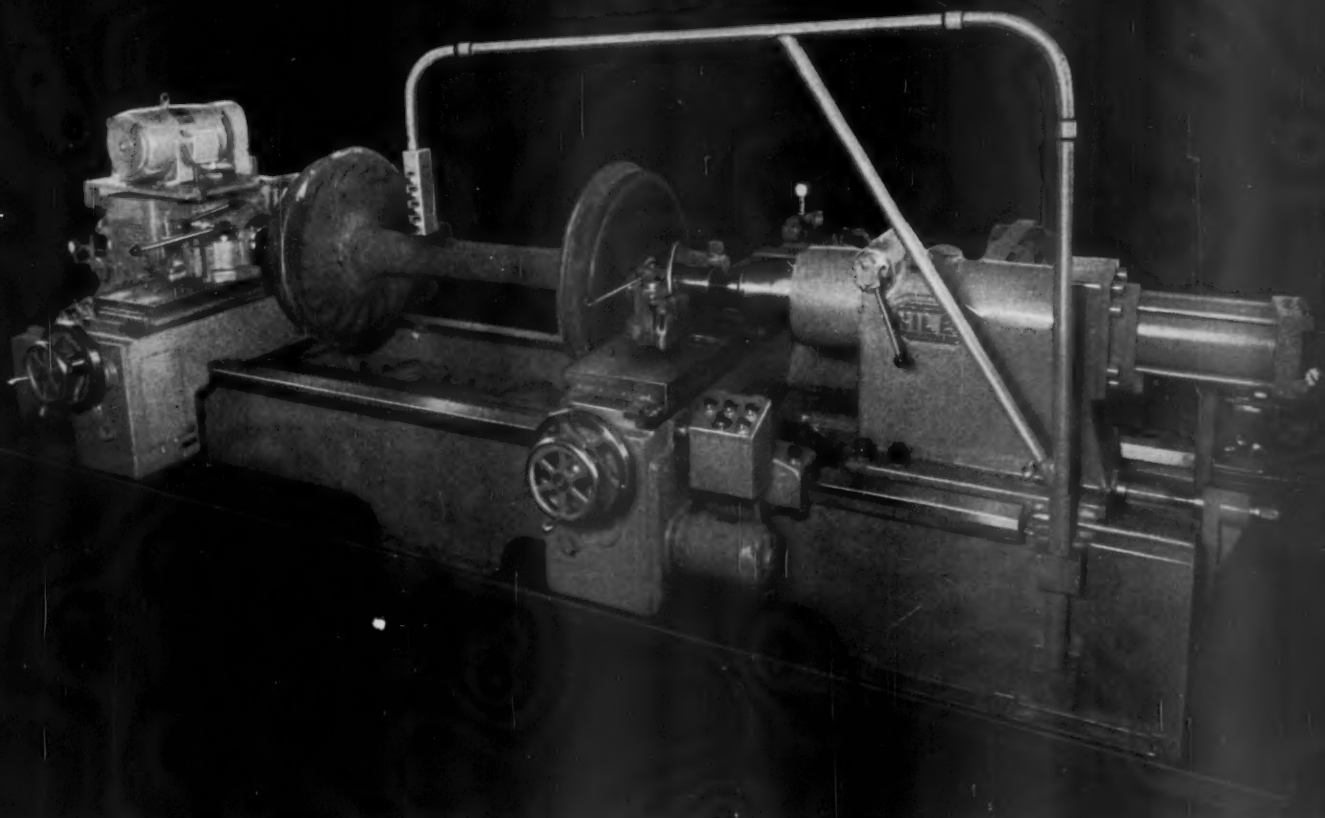
Before commencing regeneration, the EF4 controller handle must be moved to

the *OFF* position and engine run and generator field switches on the diesel panel in the EF4 cab must be thrown to the *OFF* position and left in that position until regeneration is discontinued.

The diesel booster should only be cut in when there is actual need for additional tractive force to handle a train on an ascending grade. When the electric locomotive is used without the diesel booster, the locking pin in the top of the diesel throttle controller must be raised.

This scheme of operation and the equipment for making it possible were devised by Laurence Wylie, consulting electrical engineer.

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All-purpose Niles journal turning and hydraulic burnishing lathe

To the world's most complete line of railroad machine shop tools, Niles has now added a new end-drive axle journal turning and burnishing lathe. All-purpose in every respect, this new lathe can accommodate—with equal facility and economy—new and used A.A.R. car wheel sets or axles, diesel axles, or diesel locomotive wheel sets with drive gear attached.

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With ICC Wheel-Welding Ban . . .

P&WV Tests Cobra Shoes in Road Service

A NUMBER of the requirements of the ICC's recently issued Ex Parte 174, present problems to the hilly 132-mile Pittsburgh & West Virginia. Of greatest concern in these new Other-than-Steam Inspection Rules probably are the provisions of Rule 227 (o). The new rule reads: "Fusion welding shall not be used on tires or rolled steel wheels including building up of worn flanges, flat spots, shelled-out spots or for repair of cracks, except on locomotives used exclusively in switching and transfer service, and then only for repair of flat spots and worn flanges."

The P&WV's motive power roster includes 26 Fairbanks-Morse 1,600- and 2,000-hp road switchers. All of these units are used in both road and yard service. None of them have dynamic braking.

The P&WV has no machines for turning wheels in place under these locomotives. It is necessary to use a drop pit and then transfer the wheel set to a lathe in the locomotive shop. In the past, it has been the practice to weld flat spots on the drivers of these road switchers and no difficulty has ever been encountered. Because it has, so far, been im-

possible for the P&WV to justify a wheel truing machine, and because the ban on wheel welding is effective January 1, 1959, it was necessary to seek some other answer.

Recently the P&WV has completed its second installation of composition Cobra brake shoes, made by the Railroad Friction Products Co. As yet, the two units have not operated long enough to tell exactly what these shoes can do. A number of railroads already have switching locomotives equipped with them, and report that these shoes last several times as long as those formerly standard. The railroad operated by the Erie Mining Company in Minnesota, (RL&C, August 1957, p. 52), has all of its road units fitted with Cobra shoes.

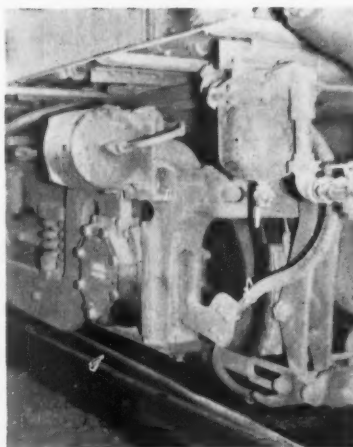
The P&WV has been one of the first railroads to convert existing road-service locomotives. The mechanical department found it was an extremely easy job. A conversion kit from Westinghouse Air Brake includes bushings for each of the eight brake cylinders, grommets for sealing these bushings against the brake cylinder heads, new smaller pistons, the 16 composition shoes, and a pressure spring for the locomotive's independent brake valve. The change was made in approximately four hours.

Braking forces must be reduced with these shoes because of their higher coefficient of friction. Some roads, in equipping switchers, have attempted to cut the brake cylinder pressure and use the original cylinders without bushings. The manufacturer recommends that the cylinder pressure actually be increased while the piston area is cut to insure that brakes will release because a substantial pressure differential exists between the applied and the released positions. Cobra shoes used on P&WV locomotives are of the type which brake on the flange surfaces as well as the tread.

The constant frictional characteristic of the composition shoe is what the Pittsburgh & West Virginia expects to prevent wheel sliding. Tests run on the converted locomotives showed that it was virtually impossible to slide the wheels even with a full application of the independent brake. Several weeks of operation on the road have shown that the wheels are not developing their usual quota of flat spots. At the same time, they are not requiring the frequent shoe changes which were formerly necessary.



Locomotive 62, first P&WV unit to get composition shoes, was operated as a center unit of a three-unit locomotive initially. When controlled from units with standard independent brake pressure settings, the higher brake cylinder pressure could not be applied. Had Locomotive 62 been used as the lead unit, its 56 psi independent brake setting would have slid wheels on units with metal shoes.



Conversion involves changing the brake shoe and applying new piston after bushing the cylinder. Flange-type shoes are used on the P&WV locomotives.

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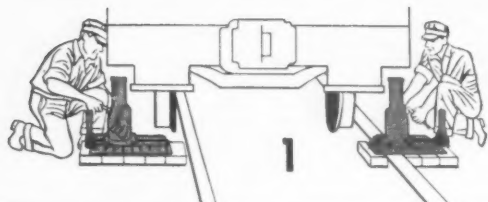
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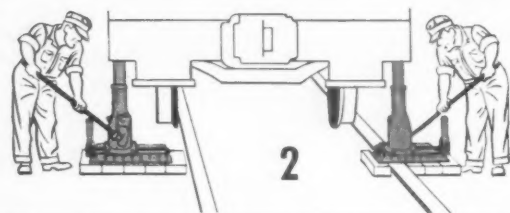
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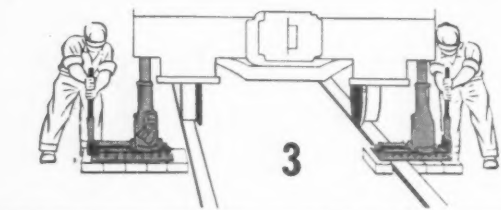
How to get back on the track quickly Without A Crane!



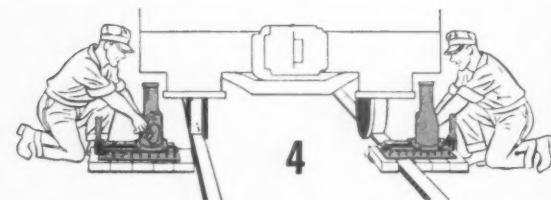
Place a Duff-Norton traversing base and jack beside each derailed truck.



Jack up the car or locomotive until wheels clear top of rails.

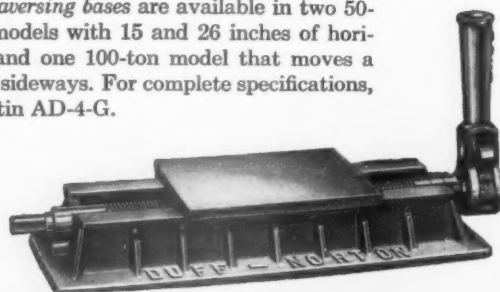


Move jacks horizontally simultaneously on traversing bases until wheels are in alignment with rails.



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What's New

(Continued from page 24)

is simple, no basic alternations either to the motor or tool being involved. Buckeye Tools Corporation, Dept. RLC, 5053 Springboro Pike, Dayton, Ohio.



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Magnus Strip Coat SC100 forms a white opaque film which can later be peeled easily from the surface. It is used in paint spray booths for improving illumination and for removing overspray which accumulates on walls. Strip Coat is non-toxic. It contains no chlorinated solvents; has a solid content of 30 per cent, and can be applied by spray or brush. It colors 200-300 sq ft per gal and dries in 10 min. No thinner is needed when applied by pressure spraying equipment. Magnus Chemical Company, Dept. RLC, South ave., Garwood, N.J.



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(Continued on page 76)



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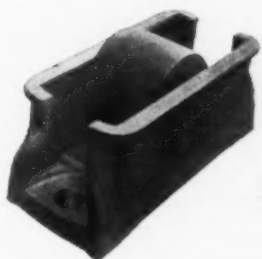
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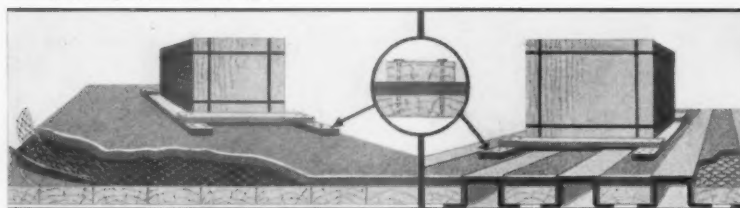


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stronger scale range construction, insulated operating trigger, and plastic handle. Pressing the trigger snaps the tongs around an electrical conductor without breaking circuit or insulation. Readings are instantly obtained. There are no coils or windings, eliminating danger of burnouts.

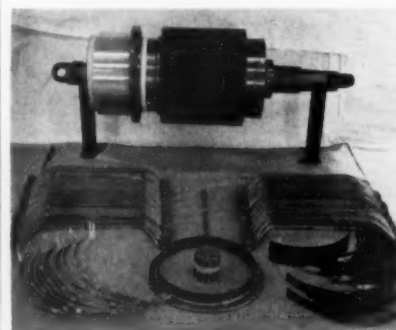
The Tong Test is available in eight different types and measures up to 1,000 amp. It is equipped with larger interchangeable ranges, making it impossible to read the wrong scale. *Columbia Electric Manufacturing Company, Dept. RLC, 4519 Hamilton ave., Cleveland 14.*



Leak Detector

Tracing fuel line and injector leaks with the Blak-Ray lamp, which causes oil to fluoresce, makes it possible for a leak to be traced directly to its source. Diesel fuel oil glows deep blue, and lubricating oil glows a bright blue-white.

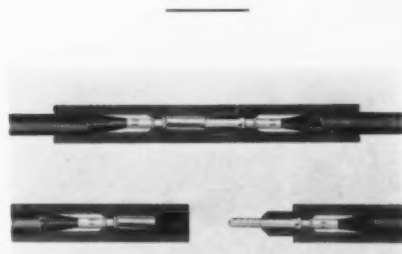
The Blak-Ray is harmless to eyes and skin and is available for 110-volt a-c and portable battery operation. *Black Light Eastern Corp., Dept. RLC, 201-04 Northern Blvd., Bayside 61, N. Y.*



Traction Armature Rewind Kit

The kit contains molded-form coils based on a special 100 per cent solids epoxy-resin insulation. Each coil is molded to the exact dimensions of the armature slots—eliminating voids, air pockets and solvent passageways. The construction is claimed to provide positive space factor and extreme winding ease.

According to the manufacturer, breakdown readings exceeding 10 kv have been obtained at room temperature, with the dielectric strength retained substantially unchanged to 500 deg F. Readings are not changed after 24-hr total immersion in water. The coil is not affected by solvents, oils or other contaminants. *Epoxy Coil Corporation, Dept. RLC, 11510 S. Alameda st., Los Angeles 59.*



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Magnus 215-D, a liquid compound for use in steam cleaning machines, has been formulated for the heavy duty requirements of cleaning railroad equipment and machinery. Its detergency and wetting action are said to give rapid penetration, emulsification and dispersion of thick, dirty, greasy deposits from metal surfaces. It eliminates the possibility of undissolved material clogging lines and nozzles of cleaning machines, and does not have to be premixed. Water conditioning agents in 215-D prevent build-up of scale on the coils of the machine.

It rinses fast and thoroughly. When rinsed correctly, no white film of unrinsed residue is left. It is non-toxic and contains no cresylic acid, chromates or phenol. *Magnus Chemical Company, Dept. RLC, South ave. Garwood, N. J.*

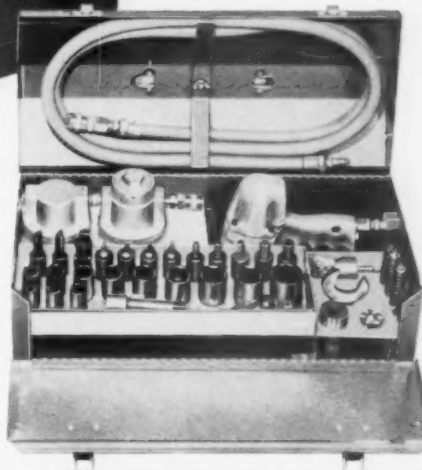


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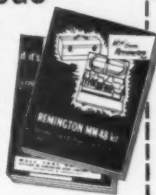
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Switching over from a so-called "economy" cleaner to Oakite Compound No. 88 saved a Class 1 road more than \$2600 a month. Why? The Oakite material proved more efficient. It not only cleaned car exteriors thoroughly, and left windows streak-free and sparkling — but did it with more *dilute*, more *economical* solutions.

While *original* cost-per-pound was slightly higher for Oakite Compound No. 88, the end results showed a real saving. Ask your local Oakite man to tell you more. Or, write Oakite Products, Inc., 46 Rector St., New York 6, N.Y.



Export Division Cable Address: Oakite
Technical Service Representatives in
Principal Cities of U. S. and Canada



Impact Wrench

This new wrench is available in two models, each rated at 3/4-in. nut-setting capacity. Both feature light weight and small dimensions. Model 18B-7 is equipped with a 3/4-in. square drive and Model 18B-7S has a 5/8-in. built-in hexagon slip chuck. Accessories include stud drivers, socket adapters, hexagon shank socket holders and universal joint socket adapters. *Gardner-Denver Company, Dept. RLC, Quincy, Ill.*

Locomotive Wiring Cable

Cable SI-58215 meets AAR Specification 581.1. It is available in sizes from No. 16 AWG up to 1,000 MCM. The small overall diameter is designed for installation in the limited space available on locomotives and cars. The conductor is coated copper, extra flexible and rope stranded. Sizes larger than No. 6 AWG have a separator between the conductors and insulation. The rubber insulation is said to be moisture- and heat-resistant. The neoprene jacket is resistant to oil, alkalis, acids and sunlight.

The cable is easy to handle and pull through conduit. Its long life is said to cut maintenance time and replacement expense. *Wire and Cable Dept., General Electric Company, Dept. RLC, Bridgeport, Conn.*



Hydraulic Journal Jack

A 20-ton capacity hydraulic journal jack, available as an attachment on the Kalamazoo Model 2500 Speed Truck, simplifies and mechanizes the removal and replacement of freight-car journal brass. The attachment includes a power take-off unit for the Wisconsin engine driving a 6-piston, 6,000-psi,



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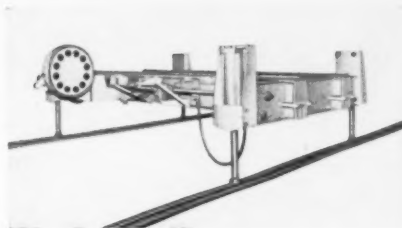
Write for
BULLETIN 35-X.



JAMES G. BIDDLE CO.
Electrical & Scientific Instruments
1316 ARCH STREET, PHILADELPHIA 7, PA.

wobble-plate type Blackhawk hydraulic pump. The control valve is a two-spool, open-center, three-position bank style, with one lever for raising and lowering the boom and one for raising and lowering the jack. The ram plunger has 6-in. travel and the effective ram area of the jack gives a lifting force of 40,000 lb. The boom can be swung 180 deg by manual rotation of the control wheel and will hydraulically raise or lower the base of the jack 26 in. above or 26 in. below the roadway level.

The truck is equipped with a 2-cylinder, 16.4-hp, air-cooled engine with automotive gear transmission, three speeds forward and one reverse. Space is available to carry replacement brasses, tools and other equipment. The weight of the truck with jack is 1,700 lb. Overall length is 155 in., width 42 in., and height 48½ in. *Kalamazoo Manufacturing Company, Dept. RLC, 1827 Reed st., Kalamazoo, Mich.*



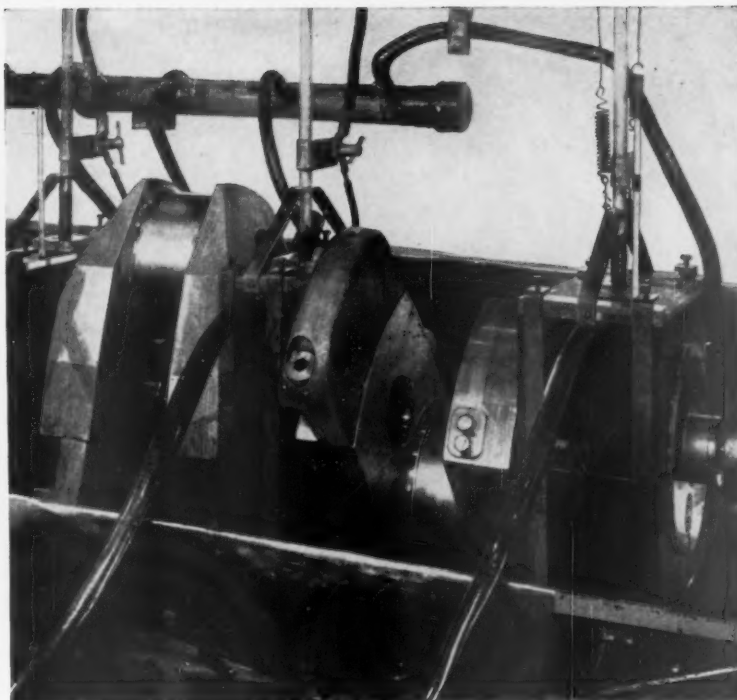
Drop Tables

These hydraulic drop tables are designed for servicing four- and six-wheel diesel locomotive trucks. Only three feet of space is required between the drop table base and the shop track. This low clearance permits the use of elevated service tracks, eliminating expensive pit construction.

One electric motor drives the hydraulic pump which provides power for all lifting, lowering and traversing operations. Geared type flow dividers meter equal quantities of fluid to and from the four hydraulic cylinders. This insures even, level raising and lowering of the table. Check valves for each cylinder act as supporting brakes should pressure to the cylinders be interrupted for any reason. Controls are interlocked so only one motion can occur at any one time.

Four hydraulically operated latch bars support the drop table and locomotive at track level. They remain extended as safety stops while the locomotive is raised to car body supports. Vertical guides insure alignment of table top rails and service track. Two rack-and-pinion-driven car body support pins securely hold the locomotive in raised position so the trucks may be removed.

The drop table is traversed by a hydraulic motor which takes its power from the electrically-driven pump. A table-mounted, spring-loaded, electric cable reel automatically lays down or retrieves cable as table is traversed. Electric motor, hydraulic pump, reservoir and solenoid valves are enclosed in a compartment to prevent entrance of dirt and moisture. Hinged cover opens for convenient access to working parts. *Shaw-box Crane & Hoist Div., Manning, Maxwell & Moore, Inc., Dept. RLC, Muskegon, Mich.*

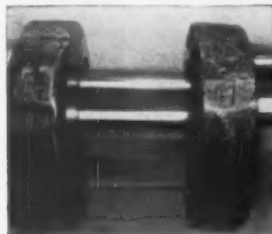


THIS REBUILT CRANKSHAFT IS CHROMIUM PLATED BY A SPECIAL NATIONAL FORGE PROCESS

When your crankshaft is reconditioned at National Forge, here's how it is chrome plated. Each bearing surface is individually boxed and plate thickness is built up only as required. Different thicknesses—over ⅛" if needed—can be added to different surfaces of the same crank. Because only the boxed surfaces are exposed to plating action the fillet areas retain their original strength.

When applied by National Forge specialists, chrome plating is uniform and smooth. Regrinding is kept to a minimum and your reconditioned crankshafts are returned to you meeting the original shaft's specifications.

No other plating company has National Forge's experience in handling both new and rebuilt crankshafts. So why not try National Forge specialists on your crankshaft rebuilding jobs?



For more details on crankshaft repair, write for Bulletin RC-1.

NATIONAL FORGE
AND ORDNANCE COMPANY
IRVINE, WARREN COUNTY, PA.

This is a finished, repaired crankshaft after processing by National Forge.



COST-SAVING SUGGESTION ON DIESEL BRUSHES



Unless commutator maintenance is figured as an integral part of diesel-electric brush costs, the result may be an entirely inaccurate slant on the relative efficiency of various brush grades.

Obviously, commutators that have been bar-burned by improper brushes cost more to recondition (and may even have to be reconditioned oftener) than those requiring only normal periodic maintenance.

Our suggestion, then, is this: *Over a span of, say, 600,000 miles, test Stackpole Brushes against any grades you may now be using. Add costs for as many brush sets as may be needed to overhaul costs on the commutators involved . . . and compare the results.*

Then you'll have convincing proof of what we mean when we say: "Stackpole Brushes help keep diesel-electrics rolling . . . p-r-o-f-i-t-a-b-l-y!"

Your nearest Stackpole field engineer will gladly help you in arranging such a test.

STACKPOLE

diesel-electric

BRUSHES

FOR MAXIMUM MILEAGE CONSISTENT WITH
SMOOTH, BURN-FREE COMMUTATION

STACKPOLE CARBON COMPANY, ST. MARYS, PA.

HELPS FROM MANUFACTURERS

The following compilation of literature—including pamphlets and data sheets—is offered free to railroad men by manufacturers to the railroad industry. To receive the desired information write direct to the manufacturer.

STATIONARY BATTERIES. 12-page Bulletin GB 1848 carries complete specifications and installation data for the new lightweight Calcium batteries from 50 amp hr to the large 1140 amp capacity cell. (Write: *Gould-National Batteries, Inc.*, Dept. RLC, Trenton 7, N. J.)

COIL SPRINGS. 48-page Heavy Duty Coil Springs Handbook includes mathematical data and charts to help buyers and users develop springs to meet exact specifications. Contains a section entitled "Fatigue Resistant" Single Heat Treated, Shot Peened Helical Springs. (Write: *Crucible Steel Company of America*, Spring Division, Dept. RLC, Box 2518, Pittsburgh 30.)

FLAME CUTTING MACHINE. 8-page booklet, form ADC 673, details features of Airco No. 20 Radiograph flame-cutting machine. (Write: *Air Reduction Sales Company*, a division of *Air Reduction Company*, Dept. RLC, 150 East 42nd st., New York 17.)

LOCOMOTIVE CABLES. 4-page folder, Pub. 19-278, describes GE line of cables for power, control, and other essential circuits in new or maintenance wiring of many types of locomotives. (Write: *General Electric Company*, Dept. RLC, Bridgeport, Conn.)

WRENCHES AND HAND TOOLS. 156-page industrial tool catalog for users of power-driven nut runners and impact wrenches. Dimensions and specifications listed, also automotive tools and shop equipment for car and truck fleets. (Write: *Snap-On Tools Corporation*, Dept. RLC, 8028 28th ave., Kenosha, Wis.)

MATERIALS HANDLING EQUIPMENT. 8-page Catalog No. 58 covers safety hoist hooks, insulated safety links, safety hooks for utilities, truck step, and back-up alarm. (Write: *E. D. Bullard Company*, Dept. RLC, Sausalito, Cal.)

CENTERS AND GRINDER DOGS. 20-page catalog describes full line of Red-E centers and grinder dogs, including railroad axle and wheel-turning machine centers. (Write: *Ready Tool Company*, Dept. RLC, 150 Garfield ave., Stratford, Conn.)

SPEED MEASURING INSTRUMENTS. 20-page Bulletin 35 covers a wide selection of ranges and types of speed measuring instruments for applications in all industries. (Write: *James G. Biddle Company*, Dept. RLC, 1316 Arch st., Philadelphia 7.)

CUTTING TORCHES. 6-page folder (Form 1174) describes complete line of Oxweld flame-cutting apparatus for every flame-cutting job and for every fuel gas combination. (Write: *Linde Company*, Division of *Union Carbide Corporation*, Dept. RLC, 30 East 42nd st., New York 17.)

SURE and SAFE...



Yellow Strand Braided Safety Slings

You're sure with Yellow Strand Braided Safety Slings on your equipment. These slings combine strength and flexibility to provide safety and ease of handling.

There's a Yellow Strand Sling designed to handle any load on your railroad from a highly polished crankshaft to a Diesel locomotive. Write us today and tell us the size, weight and nature of your problem lift. Our engineers will design a sling to exactly meet your needs! Broderick & Bascom Rope Co., 4203 Union Blvd., St. Louis 15, Mo.

Yellow Strand[®]

WIRE ROPE



Monon Railroad Speeds Car Repair with Arcair

Use of the Arcair Torch at the Monon Railroad Car Shops, Lafayette, Ind., is standard procedure on all types of cutting and gouging applications.

Here's why . . . Arcair has cut metal removal time on all jobs encountered. On car repair, for example, it formerly took 6 hours to vee out a center plate cracked stem to stern. Now, Arcair gouging *plus* re-weld takes a total of only 2 hours, just $\frac{1}{3}$ the time. And three Arcair Model H-3 torches are used "just about every place"—removing truck pedestal liner welds, welded patches, etc.

Arcair can help you too! Basic simplicity—electric arc plus ordinary compressed air—makes Arcair the new, efficient, cost-cutting answer to your metal removing problems.

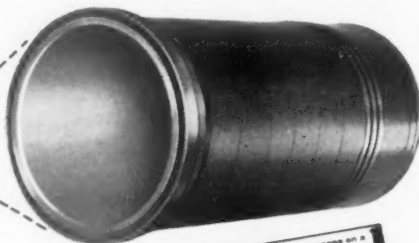
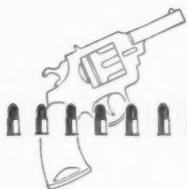
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as uniform as
the rifling
of bullets from
the same gun!

The distribution of pockets that retain the lubricating oil on the bearing surfaces of Mecrome liners is as uniform as the rifling of bullets fired from the same gun! This means "break in" periods are rapid. The bearing surface has no large solid unetched areas that cause friction where the liners contact the rings. This even distribution of pockets also results in long liner life as there are no large soft spots that wear out prematurely. Keep diesels in service longer. Send us a trial order today.



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A complete description of the many advantages
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IN CANADA: NATIONAL HARD CHROME PLATING CO. LTD., TORONTO, ONT.

Personal Mention

(Continued from page 18)



H. M. Wood

Pennsylvania.—Philadelphia: H. M. WOOD appointed assistant chief mechanical officer—car. G. R. WEAVER appointed superintendent of equipment, Philadelphia Region, succeeding Mr. Wood. G. S. WEBB appointed assistant to chief mechanical officer, succeeding H. H. HAUPT, retired. New York: E. C. HANLY appointed superintendent of equipment, New York Region, succeeding Mr. Webb. Altoona, Pa.: A. R. MARSH appointed assistant manager heavy repair shops, succeeding Mr. Weaver. Baltimore: R. E. PINKHAM appointed superintendent of equipment, Chesapeake Region, succeeding Mr. Marsh. Columbus, Ohio: C. R. SEITZ appointed assistant enginehouse foreman, St. Clair enginehouse. Pitcairn, Pa.: F. R. WILDES appointed assistant enginehouse foreman. Formerly gang foreman, Juniata enginehouse. W. R. RILEY, inspector, appointed mechanical inspector.

Supply Trade Notes

ACF INDUSTRIES, INC., AMERICAN CAR & FOUNDRY DIVISION.—A \$1,000,000 building is planned to house railroad car-cleaning and painting facilities at the Huntington, W. Va., plant. The present paint shop will be torn down for the new one-story building which will have approximately 63,000 sq ft of floor space.

EX-CELL-O CORPORATION.—Headquarters for sales and service personnel in the New York Area opened in a new building at 36 Commerce street, Springfield, N. J. William M. Thompson is district manager, in charge of the new office. Assisting Mr. Thompson are L. Graham Collins and Herbert H. Molk.

DU PONT COMPANY.—Roy A. Robichaud appointed railway finishes representative, Atlanta regional sales offices, Finishes Division.

AMERICAN AIR FILTER COMPANY.—The New York City branch office and the Eastern Regional office moved to 292 Madison avenue, New York 17. William F. Peters is manager of the New York City branch office, and C. J. Gaspar, manager of Eastern Region.



Robert H. Beetle



Herbert H. Warren

AMERICAN BRAKE SHOE COMPANY.—*Robert H. Beetle* appointed chief engineer, Southern Wheel products, Railroad Products Division, at New York, succeeding *Robert A. Gow*, retired.

ELECTRIC STORAGE BATTERY COMPANY.—*Herbert H. Warren* appointed New York branch sales manager, succeeding *John W. Weigt*, retired.

WESTINGHOUSE AIR BRAKE COMPANY, AIR BRAKE DIVISION.—*W. W. Wagner* appointed representative, in charge of St. Paul office, succeeding *T. W. Baldwin*, retired.

C & D BATTERIES, INC.—*Power Operated Products*, headed by *Harvey J. Poplis*, appointed sales and service organization for C & D in Cincinnati.

HEWITT-ROBINS, INC.—*Beck & Blatchford, Inc.*, appointed transportation industry sales agents for Hewitt-Robins latex foam rubber and urethane foam products.

A. M. BYERS COMPANY.—*Robert J. Heister* appointed manager of Pittsburgh Division.

BEYER PEACOCK (HYMEK) LTD.—Beyer Peacock (Hymek) has been formed to unite the resources of Beyer Peacock, Armstrong Siddeley, and the Brush Group for the design and construction of diesel-mechanical and diesel-hydraulic locomotives. The new company is located at Locomotive House, Buckingham Gate, London SW1, England. The manufacture of the locomotives, however, will normally be undertaken by Beyer Peacock at its works at Manchester, England.

PENNSALT CHEMICALS CORPORATION.—Industrial Chemicals Regional office, formerly located in Alcoa building, Pittsburgh, moved to new quarters at Natrona, Pa.

UNITED STATES RUBBER COMPANY.—*Dr. Thomas L. Wilson* appointed manager Research Center, Wayne, N. J., succeeding *Dr. Arthur E. Brooks*, appointed an assistant director, research and development department.

WESTINGHOUSE ELECTRIC CORPORATION.—A manufacturing and repair plant, to serve railroads and other industries in Florida and southern Georgia, will be built by Westinghouse in Baldwin, Fla.

K. W. BATTERY COMPANY.—*Robert Rinehart* appointed midwest regional sales

for every requirement

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HOSE & FITTINGS

- Fuel Lines • Hydraulic Systems
- LP-Gas Lines • Air Brakes
- Lubrication Systems • Water
- Coolants • Refrigerants

Made in a wide variety of sizes and types for hundreds of commercial and industrial uses, Stratoflex detachable and reusable fittings simplify maintenance and assure leak-proof connections under extreme temperature variations. Stratoflex hose provides the flexibility, small bend radii and durability essential for dependable service.

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manager, Chicago; and *Donald R. Wickman*, eastern regional sales manager, Pittsburgh, succeeding *Mr. Rinehart*. *Arthur E. Wilson*, southeastern regional sales manager, appointed sales representative for Mississippi, North and South Carolina, Tennessee, Arkansas, and parts of Alabama and Georgia. *Gordon F. Koehler* appointed sales representative in Milwaukee area, and *John Schnei-*

der, sales representative in the Cleveland-Toledo-Detroit area. *James G. Eliasek* appointed railroad representative in Richmond, Va.

Obituary

HARRY E. MUCHNIC, founder and chairman of the board, the Locomotive Finished Material Company, died on June 26 at Atchison, Kan.



General American Transportation Corporation's Clejan type cars have been leased to the United States Freight Company. This marks the first time forwarders will move freight extensively by piggyback instead of conventional box car. SP now uses Clejan type cars on many runs in the west and southwest. Republic Carloading has also contracted with General American for these 79-ft 6-in. cars which weigh only 49,000 lb and can carry containers or trailers interchangeably.

WESTERN LOCOMOTIVE and CAR JACK

lifts capacity
loads easier



WESTERN has made the first major change in Locomotive and Car Journal Jacks by adding TIMKEN tapered thrust roller bearings, replacing ball bearings. This major improvement means reduced friction, greater speed, easier operation and less maintenance . . . available in 25, 35 and 50 ton capacities. Aluminum or malleable steel housings available in 25 or 35 ton models.

8018

Write for Bulletin No. 1957



WESTERN RAILROAD
SUPPLY
COMPANY

Division of Western Industries, Inc.

2742 West 36th Place, Chicago 32, Illinois

Stocking too many brush grades?



NATIONAL stopped this brush mix-up
with one all-purpose brush grade!



C. F. EISELE

This railroad used a number of different brush grades of the same size on similar auxiliary motors of its freight units, says "National" Carbon Brush Man, Chuck Eisele.

Stocking the various grades was problem enough. Much worse was the danger of mix-ups — outfitting motors with the wrong brush grades.

By carefully analyzing work loads, Chuck Eisele was

able to recommend *one* "National" brush grade to handle all auxiliary motors. The mix-up and stocking problems were solved completely.

Solving brush problems is a specialty of "National" Carbon Brush Men serving the nation's railroads. The men's training, backed by National Carbon *long term brush development*, make them your best consultants.

Call your National Carbon Brush Man or write to National Carbon Company, Division of Union Carbide Corporation, 30 East 42nd Street, New York 17, N. Y.

"National", "N" and Shield Device, and "Union Carbide" are registered trade-marks of Union Carbide Corporation
NATIONAL CARBON COMPANY • Division of Union Carbide Corporation • 30 East 42nd Street, New York 17, N.Y.
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Lewis sealite car bolts

Each Lewis Sealite car bolt has special "wood engineering" beveled head for flush, moisture tight, fit... without countersinking. Standard and large-head car bolts have patented fins that grip wood, prevent turning... slotted head bolt can be set with screwdriver. Available in Hot-Dip galvanized finish for "Long Life Economy," in black for low first cost. Call, write or wire for sample prices.

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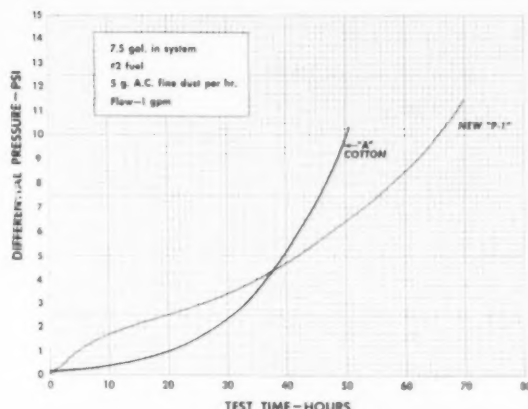
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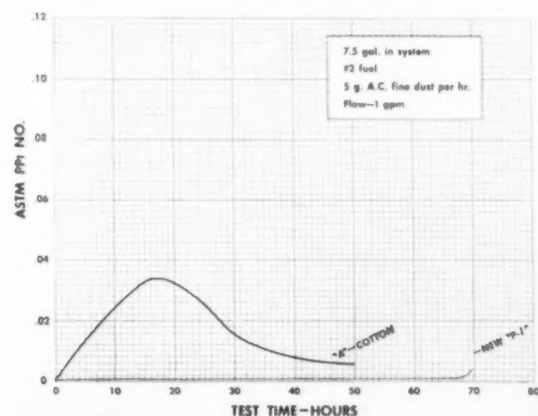
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Applied Research in Filtration Saves Money for Railroads, too!

NEW CLEANLINESS IN FUEL AND LUBRICATING OILS EFFECTS MAJOR ECONOMIES IN DIESEL OPERATION



Test to demonstrate the comparative efficiency (retention of contaminants) and flow characteristics (pressure drop) of standard 2nd stage fuel filter cartridge "A" versus the new WIX P-1 pleated paper cartridge. With a condemnation limit of 10 psi, cartridge "A" indicates on the chart above a life cycle of 50 hours versus 66 hours for the new WIX development. Note that, throughout its longer service life, the WIX cartridge never exceeds trace amounts as opposed to the performance of cartridge "A" as shown on chart below.



Shown at the left—WIXITE Primary Fuel Filter Cartridge. At the right—the New WIX P-1 Second Stage Fuel Filter Cartridge whose outstanding performance is pictured above.

When a few specks, no larger than the point of a pin, can disrupt the entire schedule of a railroad system, the economic importance of clean fuel oil is well illustrated — but, in only one of its aspects. Engine trouble, caused by fuel failure, is a catastrophe. The day in and day out erosion of vital engine parts, which is the progressive penalty of contaminants in lubricating oil, may be equally costly. Combined, these problems represent significant sums in the annual operations budget.

Research and development by WIX, based on years of study, have made marked progress in the areas of both fuel and lubricating oil filtration. WIX Filter Cartridges were the first to supplant the old hand-filled waste packed filters which today are pretty generally recognized as "extravagant" economies.

Today WIX offers comprehensive coverage of all oil filtration needs on diesel locomotives . . . lubrication, primary and secondary stage fuel. This coverage embraces many filtering media so that engineering can prescribe the precise filtering formula to suit the engine and its characteristics as well as the service or environment in which it operates.

WRITE:



Get the facts on new developments in WIX Engineered Filtration and the new WIX Railroad Filter Catalog.

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Gastonia, N. C.

Please send me information on new WIX developments and the complete WIX Railroad catalog.

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Company

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City Zone State

How railroads can plan now to start saving 288 million dollars a year

THE railroads' savings in maintenance and operating costs will soar to an estimated \$288,000,000 a year—about \$144 per car—when all freight rolls on roller bearings. Is there a railroader anywhere who doesn't dream of such savings? And this is no dream! It's a logical first step in railroad improvement because the American railroads are no better than their rolling stock.

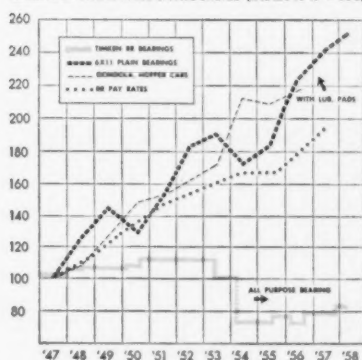
The railroads have been trying to speed this big switch to "Roller Freight"—and we've done our best to help. We've made "Roller Freight" more and more practical. Today, the extra cost of equipping a freight car with Timken® roller bearings is almost 50% less than it was just 10 years ago. At the same time, the cost of friction bearings and other things the railroads buy has been going way up (see chart right)—the price gap has been greatly narrowed.

Today we're putting revolutionary production techniques to work to help cut our manufacturing cost. We've built a whole new manufacturing line in Columbus, Ohio just to produce freight car roller bearings—20,000 car sets every year. It's a \$7 million investment showing our faith in the future of the railroads. This new facility is designed to meet the demand of a regular, planned "Roller Freight" program. And, if railroads make the most of it, costs can be kept down.

Here's just one idea on how to make the most of this new plant.

Each railroad could plan to put a certain percentage of its freight cars on roller bearings every month

TIMKEN BEARING COSTS HAVE STAYED DOWN WHILE OTHER RAILROAD COSTS HAVE SKYROCKETED (INDEX 1947 = 100)



SOURCES: AMERICAN RAILWAY CAR INSTITUTE • INDEX FROM AAR—ICC STUDY — AAR INTERCHANGE RULES

or every year. By doing this, all the railroads would share in the benefits of conversion to roller bearings. And by putting these cars in interchange, they would share the benefits because they'd stand to *get back* through the interchange system about as many "Roller Freight" cars as they'd *put* in interchange. And a steady demand for roller bearings would automatically keep bearing costs down.

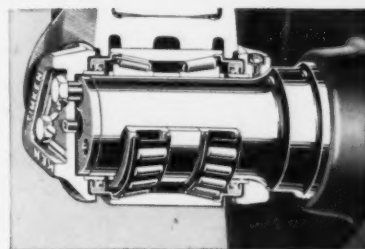
By making it practical to start right now buying roller bearings—the bearings that all the railroads *want* to use sooner or later anyway—the railroads will be off and running to a new Golden Age. Eventually, every single freight car in America will be roller-bearing-equipped.

These "Roller Freight" cars will attract thousands of new customers because you'll be able to *guarantee* faster, more dependable shipping. Your manpower will become more

productive. Your bearing maintenance and operating costs will be reduced to rock-bottom levels.

Savings can start right away. Each car put on Timken roller bearings will mean eight fewer potential hot boxes to worry about. Each car on Timken bearings will take only a fraction of the present time needed for terminal bearing inspections. And each car on the new Timken "AP" bearings produced in our new plant will go at least three years without adding lubricant. Ask your engineers and the people in your mechanical departments about the job "Roller Freight" can do for you.

And why not talk over your own ideas for planned roller bearing conversion with your railroad friends. Start the "Roller Freight" cars rolling now. Start switching to Timken tapered roller bearings for your freight cars. The Timken Roller Bearing Company, Canton 6, Ohio. Canadian plant: St. Thomas, Ontario. Cable: "TIMROSCO".



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"Roller Freight" is the next great step in railroading